METHODS OF TEACHING

CHARTERS

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METHODS OF TEACHING

DEVELOPED FROM A FUNCTIONAL STANDPOINT

BY

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PREFACE

The point of view from which the problems of teaching are discussed in this text is a functional one. It presupposes that all subject-matter has been created and preserved by the race to satisfy needs and solve problems, and that in the schools such parts of this subject-matter as satisfy the most fundamental needs are taught to pupils. But this is not done in indiscriminate order. Rather, in the main, any unit of subject-matter is best presented when the need for whose satisfaction it is preserved is potentially or actually present in the experience of the pupils. In accordance with this view the intrinsic function and the structure of units of subject-matter become of prime importance, involving a phase of methods of teaching to which relatively little attention has been paid in pedagogical literature. To complete a practical description of this conception as applied to teaching it has been found necessary to discuss the methods of arousing the appropriate needs and the conditions under which they are found present, and to investigate the methods pursued by experience both in satisfying these needs, to the aid of which subject-matter is invoked, and in securing the maximum degree of such satisfaction.

It is to be hoped that the point of view here developed will not be confused with the problem of school discipline concerning the authority of the teacher. In answer to the

question, Are pupils expected to study subject-matter if they do not feel the need for it? only an affirmative answer can be given, and such answer should be given emphatically. The points to be remembered are these: Authority is the buttress of the school; but other motives than that of mere obedience to authority may and should be used. When other motives fail recourse should be had to obedience, to the study of subject-matter merely because it is prescribed by the school authorities.

For the philosophical standpoint utilized and applied I am indebted to my instructors in the University of Chicago and particularly to Professor John Dewey, and for the psychological analogies which have steadied and illuminated the application of this standpoint I am under obligation to Professor J. R. Angell. For assistance, through criticism and suggestion, acknowledgment is made to Dr. J. H. Coursault of the University of Missouri, to Dr. I. E. Miller of the Milwaukee State Normal School, to Dr. G. M. Whipple of Cornell University, to Dr. A. W. Vining of Brandon College, to Mr. R. K. Row of Chicago, and to my wife. For assistance in developing the standpoint and for forbearance while this was under way I am deeply grateful to my former colleagues in the Winona, Minnesota, State Normal School. For suggestions from sources too numerous to acknowledge individually I am indebted to writers upon educational problems.

W. W. C.

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METHODS OF TEACHING

CHAPTER I.

THE STANDPOINT OF THE TEXT.

Section 1. Characteristics of the Aim of Education.

In investigating methods of teaching it is necessary to formulate some aim of education, for methods of teaching are largely unsystematized. An employee in a shoe factory may cut out soles of shoes day after day without knowing anything about the finished product. But methods of teaching are not and can not be so mechanically systematized. They must be fluent, not fixed and ready made. They vary with the child and with the subject-matter. Hence the student of methods of teaching must have an idea of the process as a whole, must have some objective point toward which to work in order to make such organization as is necessary for reaching that point.

Multiplicity of Aim.—But the aims of education are numerous. Eight are mentioned by two recent writers, three of them being mentioned by both. Bagley[1] includes in this list the Bread and Butter aim, the Knowledge aim, the Culture aim, the Harmonious Development of all the Powers and Faculties of Man, the Development of Moral Character, and the Development of the Socially Efficient Individual. O'Shea[2] includes the first, second, and fourth of the above, and adds the Doctrine of Formal Discipline

[1] "Educative Process," pp. 40-65.
[2] "Education as Adjustment," Chapters 4 and 5.

and the Doctrine of Adjustment. Of statements of aims both in the past and in the present Monroe[1] mentions some fifteen or twenty. To these lists other individual statements of aim might be added.

Relativity of Aim.—Not only are the statements of the aim of education numerous, but there is no single definition which holds absolutely for all times and for all nations. Aims are relative.

First, they are relative to nationality. Each nation has problems and conditions peculiar to itself, and, hence, since it is the business of the educational system of each nation to minister particularly to the life of that nation, the aims of all the systems can never be identical to any greater degree than the lives of the nations are identical.

Second, aims are relative to the age. For the ideals and tendencies of any nation vary from age to age, changing with the shifting influences of history, and so, for any given nation the educational aim will not hold permanently to any fuller extent than we can find the same tendencies abiding permanently within the nation from age to age.

Third, they are relative to individuals in the nation. For, not all individuals in any one nation have exactly the same life to live or the same view point from which to work. Therefore, the aim of education can not be conceived to be the same for every member of the same nation. The statesman will, as a matter of course, feel that training in citizenship should be the great aim of education. But the philanthropist and social worker would hold just as strongly that social efficiency should be the supreme end. Or, again, any one individual, as for instance the

[1] "History of Education," various pages as per subject index.

teacher, may change the emphasis from one aim to another according as he deals with different individuals. For an immoral child it seems necessary to emphasize moral training; for a selfish child, social efficiency; while for an awkward child, adjustment seems to be the desired end.

The Value of Multiplicity.—To offset the seeming loss occasioned by the uncertainty of direction just outlined, there are two values growing out of this very uncertainty which are worthy of recognition.

First, it leads to richness of aim. Whenever any individual, nation or age, adopts a paramount aim of education it develops, analyzes, and applies it to life. Then, when this aim is discarded by other individuals, nations, or ages, it is not cast aside completely. Rather, the new aim that is emphasized gathers up within it all the ideas and tendencies of permanent value that have been worked out in connection with the earlier aim. Each aim worked out adds fertility and meaning to the total complex aim.

Second, it provides for greater freedom of individual development. If in any nation a single aim of education could be successful, it would indicate a nation of *one* ideal. But in the nation of varied ideals, not every individual has the same kind of life to live, nor exactly the same conditions to encounter, and hence, a variety of aims makes possible a variety of types of individual.

The Aim of Education.—We come nearer to a satisfactory conception of *the* aim of education when we consider each of these varied aims as a phase of one great, complex aim, so complex that it is as difficult to define as

are the ends and purposes of society which it mirrors. The aim which any man selects is just that phase of the whole, upon which he lays most emphasis, but it contains implicit all the rest of the great complex aim. This is evident at once if we notice how advocates of any one aim try to establish its claim to solitary importance by showing that all the other aims are implied in it. For instance, the defender of the moral aim endeavors to show that an individual has to be socially efficient, well informed, cultured, well trained, able to make adjustments with facility, in order to be truly moral. And in return, the defender of the social efficiency aim endeavors to show that morality, information, training, ability to adjust, etc., are all included in his aim. Moreover, each can defend his position equally well since each has in mind about the same content and differs from his opponent only in placing stress upon a different phase of it. Hence, to repeat, *the* aim of education is a complex idea difficult of analysis and description, but in the main capable of being *felt* by the people of the nation of whose educational life it is the motive.

Requisites of a Working Aim.—However, every teacher is forced to have some working statement of aim. What this should be is determined by the relative conditions already mentioned, and by the following additional requisite. Any aim selected should be *broad.* Information, formal discipline, or "bread and butter," as the end of education, is too narrow in its emphasis. On the other hand, morality, or social efficiency, or citizenship is each a rich and worthy ideal toward which to strive. Hence, of the two groups the latter is likely to produce the better results since it expresses, in convenient form for thought

and guidance, *more* of the total complex aim of education than do the statements of the narrower aims. But the choice of an aim is determined by its value in the hands of the teacher using it.

Section 2. Distinctions in the Meaning of Aim.

Before stating the aim that is to be the point of view of this text it is necessary to point out that there are two quite different aspects of aim which are fundamental in the consideration of problems of teaching.

Society's View of the Aim.—The school is established and conducted as an organ of society. A long time since, parents recognized their inability to properly instruct and train their offspring; consequently they organized the school, and provided for its maintenance. The school thus became an organized enterprise of society. Therefore, society possesses the right to require that the school shall educate its offspring so that they will be prepared to carry on the work of society with efficiency.

It is society's aim which we have usually in mind when we speak of the aim of education. For example, when we speak of social efficiency as an aim of education we frequently mean that it is the business of the school to train children so that when they come to take their places in adult society they may do their part in the total life of the community with efficiency. Society looks upon the school and the pupils entrusted to it in much the same light as we view the funds necessary to liquidate a promissory note. The principal is due upon the date of the graduation of the students; society is concerned only that the obligation be met at maturity; it leaves to the school

the methods of raising the funds to meet the obligations at the proper time.

The Individual Aspect of the Aim.—But, to continue the illustration, there is another phase to the transaction. The teacher has immediately to set going business enterprises which will produce the principal against the time of maturity of the note.

Thus, we are at once forced to consider the resources at his command, and so we are brought face to face with the pupils. They are the resources which must be developed to produce the quality and quantity of social commodity which will offset the claims of society upon the school.

In other words, we are compelled, as soon as we begin to discuss the problems of teaching, to consider the *conscious* aim of the pupil. We have to investigate the aims of the school as viewed by the pupils from day to day. It is necessary to know the end which society has in view for the product; but it is equally necessary to know the ends which the pupils have in view while in school.

Contrast Between the Aim of the Society and of the Pupil.—*First,* the pupil's aim is conscious to him. He is, in school or out, consciously "aiming" to do things. He has certain problems to solve, needs to satisfy, ideals to realize, hence, actions to perform. Society's aim may sometimes be consciously in the mind of the pupil. *But for the most part,* the realization of the social aim comes as a by-product. It is rare for the child to be conscious of duties of citizenship, or social efficiency, or other adult responsibilities for any considerable part of the time.

Second, the individual phase is immediate. What the pupil wants to do can, for the most part, be accomplished

soon. The social phase seems remote to him. That which it requires can wait for a long while before it need be accomplished.

Third, the pupil's aim (problem, need, or value) is an outgrowth of his own experience, and as such is full of vitality and force. Society's aim is for him an arbitrary imposition of aim from external sources, except in so far as it can be appreciated and assimilated by him.

Fourth, the pupil's aim provides a motive ("motor") for action, a necessary condition of progress. Society's aim provides a standard for action, but not a motive, except in so far as it is appreciated by the individual.

Fifth, the pupil's aims and ends are the naïve beginnings out of which grows the aim as society sees it. This latter is the fruition, the final stage of development. It is the mature product of which the individual phases are the rudiments.

The Value of This Distinction for the Teacher.— There are several suggestive pedagogical facts which follow from this distinction between the aims of society and those of the child.

First, the teacher who desires to have his pupils become all that society wishes will find in their present needs and interests his way of approach. For, if this distinction holds, he is aware of the fact that he has to begin with the aims of the children as he finds them. They already have conscious aims, and if any other aims are to be made conscious in them they have to grow out of those already present. Because of this, the teacher sees that the method by which adult aims are to be made the conscious aims of the pupils is the method of interpretation. For in-

stance, if a pupil is to realize that good citizenship is a worthy aim it must not be presented to him as it exists in the world of legislatures, law courts, and judges, but it must be translated in terms of the pupil's world, in terms of the group to which he belongs. He must be led to see citizenship in terms of the government of the home and of the school. The sense of justice, which enables him to respect the rights of his mates must later enable him to respect the demands made upon him in the larger commonwealth of society. Only in so far as this is done can he appreciate what good citizenship means.

Second, these distinctions warn the teacher against judging pupils by adult standards. For instance, the adult standard of truthfulness can scarcely be required of a young child who is, as yet, unable to distinguish between a fact and an image. Again, that which by an adult is called stealing may not be so considered by a child.

Third, the teacher who is inclined to follow the interests and impulses of the child too far has here a standard by which to tell when they should be followed and when restrained. For obviously those interests which do not tend to the future perfection of adult aims must be restrained and those which are in line with later aims should be reinforced.

Section 3. Methodological Statement of Aim.

When we are concerned with the relation of the school to society stress is laid upon the aim of society—upon such aims as social efficiency, adjustment, morality or citizenship. But as soon as we begin to consider the purely educational question of the method by which the school is to accomplish this aim, we are compelled to place society's

aim in the margin of attention and bring the conscious aims and ideals of the children into the focus. This necessitates a psychological or methodological line of approach, an approach by way of the processes of child life, and requires some statement of the problems of such an undertaking.

Line of Approach for Methods of Teaching.—In accordance with what has been said, we shall consider the function of education in our discussion as this: *The aim of education is to assist pupils to appreciate and control the values of life.* The reason for adopting a new statement of the aim of education is chiefly that it provides a better way of approaching the problems of method, one which has not yet been worked upon to any great extent, a point of attack which seems to be rich in possibilities, and at the same time a phase of the great aim, having the other phases organically related to it.

The remainder of the text will be an attempt to interpret the teaching process in terms of *values* and their *control,* and for the present it is necessary only to make clear by illustration the meaning of the terms.

Values of Life.—By values of life is meant those things which are felt to be "worth while." To catalogue them would be impossible; but some of the most important have already been suggested in the above mentioned aims of education. For instance: social efficiency, citizenship, culture, making a living, acquisition of knowledge, and morality, are all values of life. Every value which has gained a place as an aim of education is a value worthy of consideration.

Another hint of them may be secured by considering

some of the aspects of experience. For instance, one of the chief values of life is a strong and vigorous physique. Another value of life is intellectual power. So valuable, indeed, is this latter considered that it has received the major part of the attention of school room *practice* (as opposed to theory) for several centuries. Still another of the values is a warm enthusiastic consciousness of the social aspect of life, sensitive to the values of service and of friendship, sensitive equally to the values of self reliance and of dependence. Still another is a rich, sensitive, aesthetic nature. Added to these we have moral, religious, and practical values.

Another way of looking at values is to connect them with problems, interests, needs, and ideals. *Every problem* of which the solution is attempted, *every interest* of which fulfillment is sought, *every need* for the satisfaction of which we work, *every ideal* which we endeavor to realize is a value. It is to us *worth while.* Otherwise it would not receive attention. Sometimes the value is low, but it is still a value.

Still another way of illustrating the values of life is to connect them with the conscious aims of which we have spoken above. Everything for which the child *consciously* works is a value. If it were not so he would not strive for it. Even where the child's conscious aim in learning the multiplication tables is to avoid a scolding, this avoidance of scolding is in itself a value.[1]

Appreciation of Values.—By appreciation is meant

[1] Adult standards of value differ from juvenile standards. Yet that does not exclude the juvenile values as *motives.* It does necessitate, however, that they be reinforced, where valuable as judged by adult standards, and depreciated where the sympathetic adult sees that they will be harmful.

both intellectual appreciation, which investigates the values in order to get the perspective of things, and also that appreciation which may be described as "emotional." It is not sufficient that pupils *know* the values of life; they should esteem them, prize them, love them as they do personal friends.

The whole question of appreciation of values, the method of the growth and development of ideals, is one which is sadly in need of analysis and interpretation. In this text we shall consider only incidentally the methods of developing richer ideals. Chief emphasis will be laid upon methods of securing control of ideals, values, problems, and needs which are in the child's experience. The ethical, methodological question of developing them cannot be elaborately discussed.

Control of the Values.—By control of these values we mean that we emphasize the ability of the pupil to lay hold upon and to secure them. It stands for efficiency. If the child has the capacity for aesthetic enjoyment he ought to be able to *secure* this aesthetic enjoyment; if he wishes to be of social service he ought *to be able* to be of social service; and if he has a desire for a religious life he ought to have the *skill to live* a religious life. When he has a scheme of values he should be able to fulfill his heart's desire in connection with any of them. This control of values lays emphasis upon discipline, upon efficient endeavor, fluency of expression, power to organize, accuracy and readiness, good judgment, and common sense.

The Standpoint of the Text.—The foregoing schematic statement of the point of view from which the

problem of methods of teaching will be attacked, is probably sufficient for the reader to get his bearings in connection with what is to follow. The standpoint is a functional one, and presupposes, *first,* that the individual gains his education through the solution of problems, the satisfaction of needs, and the fulfillment of interests; *second,* that problems, needs, and interests emerge when some obstruction arises in efforts toward the securing of the values of life; and, *third,* that the subject-matter of the course of study is an organization of instruments which have for their function the solution of these problems, the satisfaction of these needs, and the fulfillment of these interests, and is so organized as to fulfill these functions. These three facts are sufficient to interpret a great mass of the empirical rules of teaching and to throw light upon them.

The Problems to be Discussed.—In endeavoring to attack methods of teaching from the foregoing point of view we shall discuss the following problems:

1. Subject-matter, the instruments available for the control of values. (The methods of *developing* values will be discussed only incidentally.)
2. The methods by which motives for acquiring control of these instruments are secured.
3. The process by which these instruments are acquired by the pupils.
4. The process by which the use of these instruments becomes easy and accurate.

CHAPTER II.

SUBJECT-MATTER.

Section 1. Value of Subject-Matter.

Definition of the Term.—The term subject-matter is not sufficiently technical to merit a heading in encyclopedias or in dictionaries of philosophical terms. Its significance to the popular mind may, however, be taken as stated in the Century Dictionary: "the subject or matter presented for consideration in some written or oral statement or discussion."

In accordance with the spirit of the meaning therein expressed, the term, as related to educational processes, has come to refer in general to the detailed matter which is taught in schools. We find it thus used in such terms as the subject-matter of the course of study, the subject-matter of American history, the subject-matter of physics, of arithmetic, or of grammar.

The Importance of Subject-Matter.—The fact that subject-matter is frequently discussed by educators would seem to point to its importance in the process of teaching. Nor is this appearance contrary to fact. For, although the inspiring teacher, Jacotot, has said, "Everyone can teach; and, moreover, can teach that which he does not know himself", we to-day believe that no one can teach who does *not* know his subject. Indeed, there are many who take a position opposite to the one just quoted, and

hold that knowledge of the subject is alone essential. The truth of the matter is that subject-matter and method of teaching cannot be separated. And this is true for the reason that a method of teaching a subject is the manner of development and organization of the subject-matter in the minds of individuals.[1] Hence, in a discussion of methods of teaching, a consideration of subject-matter is of prime importance.

Inadequacy of Its Treatment.—But while it is an obvious fact that subject-matter has every right to consideration, the treatment which it receives in educational theory is inadequate. That this is the case is due to our failing to distinguish clearly between the educational aim which society has in causing the child to be educated, and the conscious aim which the child has in studying any *specific unit* of subject-matter. For, while it is true that the aim of education is, for instance, to help citizens of a country to solve moral problems, it does not follow that in every situation during a pupil's life he is conscious of a moral problem in connection with every unit of subject-matter that he studies. Nor can we say that every unit of subject-matter studied has as its purpose the solution of moral problems. Hence, when we try to apply these ultimate social ends to specific, everyday assignments, the process breaks down, and society's educational aim is laid aside without being utilized for *specific* guidance. And, since the teacher finds it impossible to use this aim in every lesson, he is compelled to seek some other incentives for the daily assignments. These all reduce themselves in the main to this, that the assignments are made to be learned, and that, therefore, they must be learned by the

[1] See Chapter 7.

pupil, who, in turn, is supposed to trust to the school as the sponsor for their value.

If the teaching process is carried on under these conditions, there is no necessity for getting any definite view of the purpose of subject-matter. As a result, sometimes the teacher falls into the error of accepting the subject-matter without a question of its specific value to the child, and views it as a pre-ordained system arranged for the purpose of being acquired by the child one piece per day.

Necessity for Fuller Treatment.—But, as soon as we look at the material to be taught as either an aid to the child in the growth of *ideals,* or, more particularly, as an aid in getting *control* of values, we are compelled to scrutinize each unit of subject-matter, each idea and each principle, each fact and each rule, in order to discover its specific, intrinsic purpose. So long as we posit the fact that the child is to learn all units for the same reasons, as, for instance, because they are given him to learn, there is no necessity for such scrutiny. But, as soon as we consider that he is stimulated continually by a multitude of desires, problems, and motives, and when we consider further that the race has these same desires and has created these units of subject-matter to satisfy them, we are neglectful indeed if we do not endeavor to know what desires or needs any unit which is being taught satisfies or what problems it solves.

Section 2. Subject-Matter as a Way of Acting.

By viewing subject-matter as unfolding a method by which control may be secured, a unit of subject-matter is seen to be a *way of acting.* And the word *acting* as used

here does not refer merely to overt and physical activity, but to the subtle psychical activities also, such as the intellectual, the emotional, and the aesthetic.

To one to whose vision the term "subject-matter" suggests merely the pages of a text-book, this definition will seem to be a purely academic one and widely separated from its usual context. But, a few illustrations chosen from quite different fields will show the pertinence of the definition.

Illustrations from Literature.—Tennyson's *Crossing the Bar* is a way of thinking and feeling about death. With this may be contrasted another way as presented to us in Browning's *Prospice;* or, still another, that portrayed by Bryant in *An Old Man's Funeral. The Lord's Prayer* and *Now I lay me down to sleep* are both ways of praying. *Excelsior* is a way of viewing unconquerable aspirations. *Macbeth* is a way of thinking and feeling about the progress of unfettered ambition. *Hamlet* is a way of thinking and feeling about a life of indecision. *Job* is a way of thinking and feeling about the significance of suffering. Every unit of poetry or prose is a way of thinking, feeling, or acting about something.

Illustrations from Arithmetic.—Multiplication is a short way of adding, as division is a short way of subtracting. Promissory notes are methods or ways of keeping permanent records of loans, and receipts are ways of keeping permanent records of commodities delivered. Common or decimal fractions are different ways of handling units smaller than the whole. Multiplication tables are ways of making easy the learning of facts of multiplication. Denominate numbers are ways of handling con-

crete measures. Percentage is a way of handling quantities upon a basis of 100, and the decimal system is one more or less convenient way of recording quantity. So, also, we see that every arithmetical process is a *way of acting.*

Illustrations from Sociology.—It may seem that an institution is not a way of acting. But to show that it may be viewed in that light let us consider some examples. In Presbyterianism, for instance, we have without question a very definite way of acting. Two hundred and fifty years ago the supporters of Presbyterianism thought their religious thoughts and lived their religious lives after a fashion more or less peculiar to themselves. These thoughts and principles of living they put at that time into the form of a creed, which is essentially a handy device by which to teach Presbyterians how to think and act upon certain matters. Again, the republican form of government is one way in which a group of people may act in governmental matters. The Constitution of the United States was formulated so that the people might know how they should act in certain situations. Courts have been established to interpret these rules, and to advise individuals when doubt arises as to whether they have or have not acted according to the rules laid down.

Illustrations from Tools.—Passing over to a consideration of the tools with which we make things, we again find the same definition to hold. A hammer is a way of driving nails. A clock is a way of telling time. A chair is a way of resting. A house is a method of protection from inclement weather. An inkstand is one way of holding ink, and a pen is a way of transcribing ideas to

paper. The map is a way of exhibiting geographic facts, the text-book a way of telling facts and communicating subject-matter.

Possibly this definition seems to do violence to fact for the sake of a theory. Perhaps to speak of a hammer as a way of driving nails may seem to be artificial. And it may appeal to one as being nearer the truth to say that the hammer is an object with which we drive nails. But so far as the practical individual is concerned, the essence of the hammer is just that it *is* a way of driving nails. When the individual desires to control a situation by driving nails, the hammer is to him a way of driving nails. And, so with all instruments, their instrumental function is their intrinsic meaning. The essence of each is the thing which it does.

Illustrations from Psychology.—An instinct is a way of acting which is bequeathed to the individual at his birth. A habit is a way of acting which the individual has worked out for himself and retains. Memory is a way in which the intellect acts in situations similar to others previously acted upon. Reasoning is a way in which the intellect acts in the presence of circumstances requiring a new organization of experience. Emotion is not only a form of mental action but also a mode of organic action.

Illustrations from Children's Meanings.—Perhaps no better illustration of the foregoing meaning of subject-matter in its bearing on the problems of pedagogy can be secured than examples of meanings according to children's vocabularies. Chamberlain gives among others the following:

Kiss is if you hug and kiss somebody.
Mast is what holds the sail up top of a ship.
Milk is something like cream.
Nail is something to put things together.
Nut is something with a shell good to eat.
Open is if the door is not closed.
Opera is a house where you see men and ladies act.
Pickle is something green to eat.
Quarrel is if you began a little fight.
Ring is what you wear on your finger.
Saw is if you see something, after you see it you saw it.
Vain is if you always look in the glass.[1]

We observe that, in this haphazard defining by this particular child, meanings are, with few exceptions, surcharged with action. And even in certain of the instances in which this is not evident, as "Milk is something like cream," if the question were pushed further, and if the child were asked, "What is cream?" we should find, quite possibly, that even here also the real content of his idea of the thing is an action. The foregoing are sufficient to illustrate the characterization of subject-matter as a way of acting. While the student may not agree fully, he can, at least, see what the term means as it is used here.[2]

Section 3. Origin of Subject-Matter.

By the term "origin" of subject-matter is meant the conditions under which subject-matter begins. It may refer to origin in primitive times, a topic not discussed

[1] Chamberlain, "The Child: A Study in the Evolution of Man," pp. 146-7, quoting from Wolff, "Boy's Dictionary."

[2] The psychological ground from which this method of viewing subject-matter is derived, is clearly stated in James' "Principles of Psychology," Vol. I, pp. 332-6.

in this text. Or, it may refer to the origin of new units at the present time. The latter is the situation to which attention may be briefly paid at this time, a fuller statement being reserved for Chapter 8.

The condition which gives rise to the construction of a new way of acting may be briefly stated as a breakdown, or failure, in old ways of acting. That is to say, when the way in which we have acted previously does not give us satisfactory control of a situation which we wish to control, we seek to find a new way of accomplishing our end. For instance, so long as the drunkard looks upon his drinking as a means of social goodfellowship he will continue to drink. But if he is put into a new situation wherein he thinks of his drinking in relation to his bodily health, or to the welfare of his family, and if he appreciates these as values to be controlled and sees that his drinking habits are not serving him to that end, he will begin to organize new ways of acting which will give him the desired control. Or, again, if a conscientious teacher discovers that his methods of teaching are not producing good results, he tries to invent or secure new methods which will give the desired control. The new ways of acting and the revised methods of teaching are new units of subject-matter which the individual seeks for when placed in a situation in which old ways are not sufficient to give the desired degree of control.[1]

Section 4. Subject-Matter as Reorganization.

When, for any reason, our old ways of acting become inadequate and we are led to construct new ones, there is

[1] For the psychological basis of this principle, see Angell's "Psychology," fourth edition, pp. 63-6, 214-7, 377, etc.

only one source from which we can derive assistance in the task—the new way must be evolved from the fragments of the old, due regard being had to the circumstances in which the latter proved inadequate and to which the new way must adapt itself.

Apperception.—This statement may be made clear by showing its relation to the doctrine of apperception. James in speaking of this process says[1], "The gist of the matter is this: Every impression that comes in from without, be it a sentence which we hear, an object of vision, or an effluvium which assails our nose, no sooner enters our consciousness than it is drafted off in some determinate direction or other, making connection with the other materials already there, and finally producing what we call our reaction."

This doctrine requires restatement when utilized from the standpoint of control. A practical illustration will assist. Suppose a boy has no allowance for spending money. This may work well enough until a circus is announced. He has no money, but he wants to go. The doctrine of apperception would say that here a new idea is in experience—the desire to go to the circus. Our standpoint enables us to say that here is a new value to be controlled. Apperception teaches us that this new idea is interpreted in terms of old ideas in his mind. Our standpoint requires us to say that the control comes through the old ways of acting already present. For instance, if the boy had always been in the habit of submitting easily to conditions as they came, he might stay at home. Or if he were in the habit of finding some way of earning money, he would settle the difficulty in that way.

[1] "Talks to Teachers," p. 157.

Whether or not we use the term apperception to express this idea, it still follows that new situations are controlled upon the basis of old ways already worked out. But, inasmuch as the term "apperception" is bound up with the term "idea," and since we are dealing with the individual in terms of activity, control, and values, it would be better to use the term "reorganization" of experience; since in controlling values, the whole of experience, and not merely the intellectual, ideational activities, is used.

Illustrations.—Suppose the desired value is that of being able to skate. In getting control of this value a large number of old organizations and habits have to be utilized. For instance, the muscular habits which secure equilibrium and those which enable the leg to stroke out have to be brought together and reorganized for new conditions before the skating habit is formed. Again, we are taught that all our later actions are based upon those reflex and instinctive actions which are given at birth. And from these the later habits and voluntary acts are derived by reorganization. The poem, *Crossing the Bar,* is for the reader, when first read, a reorganization of many ways of thinking and feeling, and is in the mind of its author an epitome of a lifetime of action. So also, *The Lord's Prayer,* when we first learn it, is a reorganization of many things we have thought and felt about God. Multiplication in arithmetic is a combination of a large mass of arithmetical facts. A promissory note involves such elements as writing in ink, a promise, a statement of a sum of money, of a certain length of time, and signing one's name. Presbyterianism is the product of old ecclesiastical ways of thinking and feeling in combination with certain new ways of thinking and feeling engendered by the

Renaissance. The Constitution of the United States did not spring Minerva-like from the heads of the *Fathers of Confederation*. It was the reorganization of political ideas prevalent at that time and adjusted to the peculiar conditions of America.

Section 5. Function of Subject-Matter.

Subject-Matter and Control.—From the foregoing it is evident that one function of subject-matter is to enable us to get control of things we value. When we lose control of them, needs, desires, and problems arise and subject-matter is invoked to secure the satisfaction of those needs, the fulfillment of the desires, and the solution of the problems.[1]

Two Cases.—Two conditions may arise. On the one hand, the breakdown or need may be one which has arisen at some previous time, either in our own experience or in that of the race. In such a case little reorganization is necessary. We merely adopt the way of acting which was previously worked out and applied with success. For example, if I appreciate the pleasure of companionship and have been accustomed to visit my friends in order to secure this value, and if I am absent from my friends and feel the need of their companionship, I may do as I have done in the past—call upon them. To find this method of getting companionship requires a minimum of reorganization. In these cases there is a close similarity between the present need and a need which has already been felt and for which a method of satisfaction has been worked out.

On the other hand, the new situation may be very dif-

[1] See Chapter 8.

ferent from any which has arisen before. In this case there must be a greater reorganization of experience. When a youth begins to study evolution and seeks to understand the origin of the species, he may have to make almost revolutionary reorganization among the elements of his old ways of thinking. Similarly, when the youth brought up in luxury loses all his money he is face to face with a situation of such startling novelty as to require the most radical readjustment in his ways of living.

But in all these instances the new ways of acting, whether much like old ways of acting or very dissimilar, have as their aim and function the control of values.

Subject-Matter and Values.—It is, likewise, a function of subject-matter to provide us with new values and with an added appreciation of those already possessed. Looked at in one way, values and ideals are themselves ways of acting. For instance, if a person attempts to define an ideal, he resolves it into a series of actions. If one is asked for an explanation of the ideal of civic righteousness, a catalogue is given of ways in which the righteous man acts; he votes, he works for clean politics, he helps the needy, etc., etc.

A scientific statement of the method by which subject-matter provides ideals and values has never, so far as I know, been worked out in pedagogical literature. Much has been said about the development of ideals and values as the highest function of education, but comparatively little has been said about *how* the teacher may logically and constructively proceed in order to secure this end. This much is known in an empirical way, however. If pupils are brought into contact with newer and better ways of acting, the contrast between their own and the

newly discovered ones is often so forceful as to cause development toward a higher plane. That is to say, the teacher does much for the pupil when he places the values before him and helps him to understand them. The emotional appreciation will follow, to a certain extent, without artificial stimulation.

Summary.—In this chapter we have seen that a unit of subject-matter is a way of acting which arises first when an individual does not have control of some value which he desires; that it is constructed through a reorganization of old ways of acting; and that its pedagogical function is to provide both an appreciation of values and a means for their control.

CHAPTER III.

DISTINCTIONS IN THE MEANINGS OF FUNCTION.

SECTION 1. INTRODUCTORY.

Although the idea of function discussed in the last chapter seems to be reasonably clear and easy to use, yet when we consider subject-matter in its relation to the work of the school, some further explanation is necessary. There is a confusion in the meanings given to the term which needs to be cleared up in order that subject-matter be handled with the greatest possible efficiency. With these distinctions the present chapter will deal.

In taking them up we may use as our text the tabulation of functions of history and of science found in two well-known text-books on the teaching of these subjects. Bourne, in his text-book entitled "The Teaching of History and Civics,"[1] gives the following as the values of history:

1. It interprets the world to the child.
2. It can make a direct appeal to interests which the pupil already possesses.
3. It has a moral value.
4. It should help to produce an enlightened patriotism.
5. It develops a love of truth, judgment, imagination, and historical-mindedness.

[1] Pp. 77-92.

6. It brings added pleasure within the reach of the pupil—pleasure in the study of history as history.

Smith, in "The Teaching of Chemistry and Physics,"[1] gives the following as reasons for studying science:

1. It trains in observation, comparison and induction, in imagination, and in self-elimination.
2. Its information possesses value.

Section 2. Intrinsic and Indirect Functions.

In dealing with the function of any subject a distinction must be made between the function which it serves in school and that which it serves in the economy of the race *without reference to its utility in school.* As soon as this distinction is observed, it is at once seen that neither science nor history was created primarily for the purpose of training the powers of imagination, judgment, or reason. They may serve these additional purposes indirectly; but intrinsically they were created by the race for another purpose. This leads to a distinction which may be discussed under the terms *intrinsic* and *indirect.*[2]

The Intrinsic Function of Subject-Matter.—By this term is meant the purpose for which subject-matter is now used by the race irrespective of school considerations. It may or may not be the original purpose for which the subject-matter was created, as is seen in the case of chemistry, our modern inheritance from that ancient alchemy whose object was to change the baser metals into gold. But in either case we are concerned with the purpose which

[1] Smith and Hall, "The Teaching of Chemistry and Physics," pp. 9-15.

[2] Cf. Bagley, "Educative Process," pp. 225-238.

the subject serves outside school. Viewed from this same standpoint, the function of history is to interpret the modern world in terms of the past.

Both of the authors quoted include this intrinsic function in their lists. Bourne makes it the first in his group of values, and Smith states it as the second of his two items.

The Indirect Function of Subject-Matter.—As soon as we begin to consider all the functions which subject-matter may serve in education, we are at once met by a series of values which are not included within the intrinsic function as just described. They are the by-products of the processes in which the intrinsic functions are being fulfilled. When the student is seeking to resolve material things into their ultimate elements in chemistry, he will receive at the same time, if he does the work well, additional benefits which flow therefrom. According to Smith as quoted above, he will secure training in observation, in comparison and induction, in imagination, and in that clear judgment which comes from self-elimination. And Bourne states that the study of history will also produce its residue of training by developing judgment, imagination, historical-mindedness, and a love of truth. These values are indirect in the sense that they are not striven for by the pupils as the ends to be accomplished in the study of the subjects of the curriculum, but are rather the by-products which come from the pursuit of the intrinsic function of the subject.[1]

[1] We are not considering here those subjects and units of subject-matter, such as mental arithmetic, corrective gymnastics, etc., of which the intrinsic purpose is to aid in the development of such powers as have been mentioned; though these may be included under the same term.

Classes of Indirect Functions.—Of these indirect functions there are at least three. *First,* the *disciplinary,* the training of the mental powers, such as memory, imagination, reasoning, habits of neatness, ideals of accuracy, etc. From this much of the basis of its claims to recognition has been removed by recent investigations into the facts regarding formal discipline. *Second,* the *preparatory*[1] functions which belong to certain subjects. For instance, algebra, while concerned intrinsically with other matters, has an indirect advantage, following upon the solution of its problems, in that it is a preparation for higher mathematics. The *third* class includes those *decorative* functions[2] which consist in a mere acquaintance with certain subjects. A knowledge of historical names and events, a reasonable ability to speak correct English, some acquaintance with literary characters, all have a value which is evident in a negative way at least, in the low social standing tc which one not possessing them is exposed.

Specific and Tonic Functions of Study.—Further light may be thrown upon these distinctions by considering what may by analogy be called the *specific* and *tonic* functions of subject-matter. For, just as quinine has a specific function in its selective action upon the poisons of the blood in malaria and kindred diseases, and has also a tonic action upon the whole body as a result of this specific action, so the study of subject-matter has both a specific and a tonic function. Each unit has a specific point of attack, a particular problem to solve, or need to satisfy, and in addition, the acquisition of the unit produces a

[1] Bagley, op. cit., pp. 231-2.
[2] Bagley, op. cit., pp. 230-1.

certain exercise of the whole mental system somewhat general in its action and elevating to the tone of the system. The specific function of Bryant's *Waterfowl* is, let us say, to bring to the reader the thought of the watchfulness and care of God. This is the specific function it performs; but in the study of the poem for this specific purpose there is an exercise of the imagination, there is stimulated a discrimination in the use of words, and there may be awakened a wider sympathy for birds. As a result, all of these faculties are strengthened and toned up. Again, the specific function of the process of shoeing a horse is to have the horse shod. Some of the tonic values of the operation to the blacksmith's apprentice are, more adroitness of muscle, greater keenness of eye, increasing satisfaction in doing a good piece of work, and a better understanding of the nature of horses. The specific function of a study of chemistry is to resolve matter into its elements, to get control of its transmutations, and make new combinations; the tonic values which may accrue therefrom, irradiations, so to speak, of the activity necessary to accomplish this specific end, have already been suggested.

In all these cases we are able to discriminate between the value which is being *consciously* pursued and the wider, more indefinite systemic values which flow from the effort necessary to carry out this specific function, values of which the one putting forth the effort is, perhaps, quite unconscious.

We have here a loose connection between the intrinsic and the specific functions. The term "intrinsic" differs from the term "specific" only in this respect, that the first refers to the fact that each unit was created by the

race for purposes other than those of the school; the second term adds the fact that each unit was created by the race for a specific purpose, distinct, to a certain degree, from every other purpose. The terms "indirect" and "tonic" are related in this way: the term "indirect" refers to the fact that certain values follow from the study of subject-matter as a by-product. For the most part, the term "tonic" refers to the fact that the way in which some of these values are gained and, particularly, the disciplinary value, is by the exercise of mental processes which are heightened in tone by the very fact of being exercised.

Section 3. Function for the Author, Teacher, and Pupil.

These distinctions may be approached from another point of view. We may look upon any unit of subject-matter from three standpoints:

First, we may consider the problem which the author wished to solve when he wrote. For instance, Longfellow tells us that his purpose in writing *Excelsior* was to "display in a series of pictures the life of a man of genius, resisting all temptations, laying aside all fears, heedless of all warnings, and pressing right on to accomplish his purpose."[1] This we may call the intrinsic function the author intended the poem to serve.

Second, the function of the poem from the standpoint of the *teacher* should, of course, include the intrinsic function which the author had in mind. But, in addition, the teacher may have other purposes which he intends it to serve. For instance, he may have in his classes some ambitionless boys upon whom he wishes it to act as a spur.

[1] "Longfellow's Poetical Works," Vol. I, page 79 (Houghton, Mifflin & Co., 1892 edition.)

Or, he may wish to use it as a means of giving his pupils a training in literary interpretation. Now, these are the indirect values that flow from a study of the poem and may not have been thought of by the author at all. In this case certainly Longfellow did not state that he intended the poem to be a spur to anybody, nor to give a training in literary interpretation. He says specifically that his purpose was to "display the life of a man of genius," not to present a moral or critical treatise. Hence, we see that the teacher's view of the function must include the author's, but may include many other functions beside.

Third, the function of the subject-matter may be considered from the student's point of view. When we consider what he is *consciously* working for, we find at once that he may not see as the function of the unit all those purposes which the teacher expects it to serve in his education. For instance, he may not be aware of the fact that the teacher guilefully presents *Excelsior* in the hope that it will spur him on to action, and he may not know that the teacher intends the study of the poem to give him greater powers of interpretation. Of course, on the other hand he may be conscious of the teacher's intention, and he may consciously strive for this greater power which the teacher wishes him to have. But, the point is that to the student the purpose of the poem *need* not be, and usually is not, as broad as it is to the teacher.

When we consider the relation of the pupil's view of the function to that of the author, two facts are in evidence. In the *first* place, the pupil's view may not be the same as that of the author. For instance, he may not see in the poem under discussion that there is "displayed the life

of a man of genius." The poem may be for him only the adventures of a very strange sort of boy. He may not be able to look behind the story to find the meaning which the author intended. But, in the *second* place (to lay down a principle which, while allowing for numerous exceptions, is generally applicable), the function of any unit as the author intended it and as the pupil uses it should be as nearly as possible identical. For, if each unit is a tool constructed for a specific purpose, then the pupil will as a general thing get the most good from using it for that specific purpose. A razor will usually do its best work when it is used as an instrument for shaving; the tragedy of *Macbeth* will exert its influence to the fullest degree when the function it serves in the life of the reader is that which Shakespeare created it to serve.

The teacher's, the author's, and the pupil's views of the function of subject-matter may be compared and contrasted as follows. The teacher's idea of the purpose of a unit must include both the author's and the pupil's whether these latter agree or not. It may include also certain other indirect functions of which neither the pupil nor the author is conscious. The author's and the pupil's views of the function are in the main identical; for in both the intrinsic function is uppermost. Where a discrepancy between them exists, either the author's or the pupil's point of view may determine for the teacher what is *the* intrinsic function, and which shall do so depends upon circumstances. If we are anxious to find out what the author was trying to say, then his purpose is the intrinsic function, but if we are looking for something to adopt and utilize in solving some problem of the pupil, the function of the

author becomes secondary in importance and the pupil's view becomes *the* intrinsic function.

Advantages of These Distinctions.—*First,* they make possible a separate disposition of the functions which subject-matter serves. For instance, the teacher should, in beginning to teach any subject to a class, consider *all* the values that may be controlled through a study of the subject—such things as thoroughness, honesty, neatness, and discipline of memory and imagination should be considered, and those selected which are most relevant in the particular conditions in which he finds himself. Then, from day to day, as each unit of subject-matter is taught, such of these as need special attention should be noted. In addition to this, the specific, intrinsic function of each unit should be determined. But, the indirect purposes should form the background of the stage. The specific intrinsic function should be in the foreground of the stage, the thing upon which the teacher attempts to centre the conscious efforts of the children. The indirect purposes give *guidance,* but they cannot occupy the focus of attention *all* the time.

Second, if these indirect results are by-products, it is evident that the attention of the pupils should, for the major part of the time, be directed upon the intrinsic functions of subject-matter. Most attention is given by pupils in arithmetic to measuring quantities, which is the intrinsic purpose of arithmetic, and less is given to training powers of accuracy. More of the pupil's attention will be given to communicating things of value in language, and less to the forms of paragraphs and sentences. In history the greater part of the pupil's attention should be placed upon the solving of the problems of the race in

continuous series from their ancient to their modern forms, while a smaller amount should be placed upon the training of memory and imagination.

Third, the indirect functions of subject-matter may, as we saw in Chapter 2, serve as guides to the solving of our conscious problems. For instance, no process in arithmetic will really fulfill its intrinsic function adequately unless accuracy is used. Hence, accuracy is not only a by-product; it is also an aid. It is a by-product which is so closely related to the central process that the central process cannot get along without it. This is true in the case of most of the indirect values.

By virtue of this close relationship, we are able to state the conditions under which the indirect values should be given a place in the focus of attention of the pupils—viz., when the pupils' failure to *adequately* carry out the intrinsic function of the subject-matter is imminent or has occurred. For instance, when it seems likely that they will not be able to get the correct result in measuring, or when it is already evident that they cannot, because of inaccuracy, then accuracy should be brought to the focus of attention for the time being. That is to say, attention should be paid to the indirect functions of subject-matter when the direct ones have broken down, or are on the verge of doing so.

Fourth, these distinctions enable us to draw a clear line of demarcation between the needs that children feel and the needs which the teacher feels that they have. It is one thing for the teacher to feel that a boy needs punishment; it is a quite different thing for the boy to feel that he needs it. It is one thing for the teacher to feel that the pupil needs history in order to make him a good citizen; it is

quite another thing for the pupil to feel that he has this need. Yet, no matter what purpose the teacher has in view, the function which the subject-matter will perform in the work of the school is dependent also upon how the pupil feels about it.

Of the two, the child's *conscious* need must be the starting point of the school process. If the teacher is to have the child's estimate of his own needs become identical with the teacher's estimate of them—and this latter, in the main, makes for the greater social efficiency—he must *develop* those needs which the child does feel until they come into the form of those which he, as the wiser individual, feels and appreciates.

Fifth, we see, also, that *on the whole* those units of subject-matter of which the child cannot appreciate the intrinsic function as judged from the author's (inventor's) standpoint ought not to be forced upon the pupil before the relevant needs are present. Why give him subject-matter for which he has no apparent use? It may abide for a time in memory as so much foreign material, seldom to be assimilated, probably soon to be lost.

Sixth, these distinctions further lead us to see the futility of trying to follow a text-book slavishly. The author may not have had the problems of any *real* pupils in mind, or he may have built it for his own pupils, from whom other pupils may differ. And, again, different classes which the same author may have, have different needs and problems arising in a different order from year to year. Hence, if we are to follow the conscious needs of the children and introduce subject-matter whose intrinsic function is to satisfy these needs, we must follow the lead of the

pupils and not that of the order of the text-book, unless the two run side by side.

Finally, these distinctions require the teacher to scrutinize *every* unit of subject-matter to see what is its intrinsic, specific function; for otherwise it may not be used in the situation for which it was intended. It is not sufficient to consider merely that a shovel and a fork both develop muscle. Of much more importance is it to know in addition for what each of these instruments is especially useful. If only muscular training were involved there would be no harm in pitching hay with the shovel. Perhaps that would be strongly conducive to muscular development. And yet it would not be very sensible in practical life.

The teacher should realize the folly of saying, for example, that for his purposes in class the function of *Hamlet* is to train the imagination, or to create a love for good literature. In that case, the purpose of *Hamlet* is not different from that of a hundred other poems. But when we say that the specific, intrinsic function of the play is "to show the dissolution of an indecisive character," then *Hamlet* stands by itself distinct from all other poems. The student turns to it for enlightenment concerning the question of indecision of character. That should be the central theme of the recitation, the one upon elucidation of which the most of the attention should be centered.

Section 4. Subject-Matter as End and as Instrument.

End and Instrument.—Another series of distinctions is made in the meanings of "function" of subject-matter. We know that some times a specialist claims that his subject should be studied for its own sake, while other edu-

cators may hold that it should be used only as an instrument for control of *other* things of value. That is, to state it otherwise, some educators claim that particular subjects are values *in themselves*, while others claim that they are of use only in getting control of *other* values.

This may be illustrated by answers to the following questions. *First,* Why study history? Two answers may be given: (1) because it is worth while for its own sake; (2) because it assists in the understanding of modern institutions. *Second,* Why study subjunctives in Latin? Again the two answers may be given: (1) because they should be known; (2) because they will help in understanding subjunctives in English. Or, again, Why learn to spell? And the answers are: (1) because one should be able to spell; (2) because it will be necessary in order to convey ideas correctly. In the first terms of the series we view the units of subject-matter as ends and values which are their own justification. In the second terms we view them as instruments which are of use for other purposes.

These two standpoints are held at present by some conservatives on the one hand, and by some radicals on the other. For many centuries the average teacher has been going on the assumption that the subject-matter is in the text to be learned, and that that is the end of the matter. In recent years some radicals have appeared who hold that in some of the subjects, at least, as for instance, arithmetic and grammar in the grades, none of the material should be taught except that which is found to be of use in work other than arithmetic and grammar. These subjects, it is claimed, should be studied incidentally. For the present, the dogmatic statement must suffice that, while every unit

of subject-matter is both end and instrument, nevertheless in our school systems it is the instrumental aspect of every unit which is in most serious need of being clearly understood and strongly emphasized. We have swung too far to the other extreme. We are too prone to teach a thing without caring what is its use anywhere else in life.

Advantages of This Distinction.—One advantage of this distinction is this, that when a teacher, mindful of it, endeavors to find out for himself the function of a unit of subject-matter, he will not be satisfied with the answer, "It should be known for its own sake." He will endeavor to find reasons why it should be studied for other than its own sake. For instance, when he asks himself, "Why study about the Boston tea party?" he will not be content with the answer, "We *ought* to know about it." He will ask another question, "*Why* ought we to know about it?" and will be better satisfied with the reply, "Because it helps to better understand the movement toward the Declaration of Independence." This second *why* is the more important of the two, because it gives each unit of subject-matter a chance to present evidence of its total value, both as an end in itself, and as an instrument of use in getting control of other values. By this means it is given a greater right to consideration when the teacher is deciding what to teach the children.

Another advantage of this second "why" is that it points to a way of securing a stronger motive for the study of a unit. If the pupil does not feel the motive for studying a thing for its own sake, as so frequently happens, this second "why," by revealing its use for other purposes,

points the way toward discovery of other possible motives that may be appealed to.

Summary.—Returning to our two illustrations in the introductory section of this chapter, we are now able to assign differing values and places to the members of the lists there tabulated. In the case of science, the second function listed is the intrinsic function. Whether this information should be studied for its own sake or because it may be an instrument in getting control of other values, the author does not state. The first function of science stated is indirect and disciplinary. It is a form of the tonic effects of the study of the subject-matter.

In the case of history, the first function is intrinsic. Here is *the* reason why history is studied. The second probably illustrates the fact that history is an instrument in the fulfillment of interests, and thus considers the subject-matter as an instrument. The third, fourth, and fifth are indirect functions. These come mainly as by-products; only occasionally are they brought to the focus of attention. The sixth views history as an end in itself, worthy of study because of the pleasure history as history gives.

CHAPTER IV.

THE INTRINSIC FUNCTION OF SUBJECT-MATTER.

Section 1. The Race and Subject-Matter.

The race has had from primitive times certain great and fundamental needs and interests to satisfy and problems to solve. The solution of some of these has been reduced to instincts, to reflexes, and, in the case of the individual, to habits. But the vast majority have still to be controlled by conscious effort.

Primitive man could not get complete control of his values, nor have we achieved that end completely. Yet every generation has tried to do so, and in making the attempt has utilized and added to the subject-matter (the ways of acting) of preceding generations, changing, molding, and reorganizing it as handed down by them. In this way refinements of action, niceties of method, short-cuts to the desired result, and increasing efficiency have resulted.

Among all the needs, problems, and interests of the race some are fundamental and some are transitory. For instance, we have to-day in America many problems which will not be the problems of the next generation, just as many of the problems of the last generation are no longer ours. And when they disappear they will take with them the subject-matter which was evolved to solve them. The text-books which deal with them will grow obsolete and

be no longer used, because no longer serving a vital purpose.

Thus we see that the value and persistence of the need partly determines the retention of the relevant subject-matter. The race preserves only those ways of acting which relate to valuable and persistent needs. For the labor of recording them will deter it from preserving them unless there is probability of their being used again. Indeed, if they are not frequently used they will drop out of experience naturally and of their own accord.

The other factor which determines the retention of subject-matter is the grade of its efficiency. If one way of acting satisfies a need better, or solves a problem better than another, it will be retained, while the other is allowed to slip into the limbo of things no longer useful. Hence, we find to-day that text-books in science live only for a few years and must then be discarded. On the other hand, we find the Bible still read, and Shakespeare still studied, while thousands of more recent books are already discarded. This is because no ways of satisfying our religious and moral and certain of our literary needs have been found as satisfying as these. And both these books will be retained either until the needs which they satisfy disappear from experience, or until some better ways of satisfying them are discovered.

Another fact of interest in connection with the relation of the race to subject-matter is that the needs which are looked upon as of most value call for the greatest efforts looking toward the satisfaction of them—a rule which applies to the efforts of the race as a whole and to the efforts of the individuals composing it. For example, the solutions of moral problems are much better worked out than

are the solutions of æsthetic problems, because the rank and file of humanity find moral situations more vitally connected with their total welfare than are æsthetic situations.

When we turn from the race to the school we find the same factors entering. We see, on the one hand, the needs, problems, interests, desires, and uncontrolled values of the children; and, on the other hand, efforts to satisfy, solve, fulfill, and control these things. In the needs of the child we find approximately the more fundamental and simple needs of the race; and it was with the aim of helping him to satisfy those needs that the race invented the school. The school endeavors to perform its task by securing racial subject-matter and selecting those methods which the race, after a long process of trying out and revising, has pronounced the best. These are collected either in text-books or in the scholarly material which the teacher possesses beyond the text.

From all the foregoing facts it follows that the first duty of the teacher is to determine the intrinsic function of every unit of subject-matter. What these intrinsic functions are we shall try to illustrate briefly, leaving for the teacher who knows his subject-matter the task of determining in detail the function of the whole subject-matter and the specific function of each unit within the subject.

Section 2. Language Group.

The intrinsic function of language is usually stated as the communication of ideas. For purposes of method this may be analyzed and stated as follows:

The intrinsic function of language is (1) the communi-

cation through words, (2) of things of value, (3) between persons having a like appreciation of these values, but (4) possessing different levels of control. In so far as other means than words are used for the communication of things of value we have language only by analogy. Painting is not language in the strict meaning of the word, because it does not communicate through words.

Language will not be used to best advantage unless there is something of value to be communicated. Those subjects upon which we have nothing of value to say and over which we neither have nor desire to have control we do not talk about. On the other hand, we are not only willing but anxious to discuss those topics and ideas which are of great value to us and over which we either have or desire to have control. The more valuable they seem, the more enthusiastic, forceful, and burning are our words. The man with a message is one who has a deep appreciation of some value and of the efficacy of some method of securing control over it. The ordinary school composition set by the teacher is not conducive to good expression if it is not felt by the class to be of *value*. Whether it is valuable as judged by adult standards does not affect the situation. If the pupil does not feel the value it provides no motive.

Unless there is an appreciation of values common to both speaker and hearer language will not function properly. We do not tell our good jokes to the literal-minded. The lover of Shakespeare does not discuss his beloved author with a street urchin, nor do we talk about our great ideals to one who will scoff at them. But if we find another lover of Shakespeare, how easy to converse with him for hours; and how easy it is to grow enthusiastic over

our ideals with one who is in sympathy with them! On the other hand, we are not surprised that the dry mechanical teacher of language who looks upon compositions as compositions and does not lead his pupils to feel that their themes are of real interest to him, should have pupils who detest the subject.

Unless there is a difference in level between speaker and hearer there will be little force in language utterance. Language is for the purpose either of asking questions of some one with better control, or of answering questions, implicit or explicit, by some one with a higher level of control. We do not ask a question enthusiastically of one whom we believe to know less about the subject than we ourselves. Nor, on the other hand, are we eager to give information on a subject to those who we think know more about it than we. We have to feel that we can give something that the audience will consider valuable before we use language in the way that is most vigorous and forceful.

Under some circumstances we use language as a means of revealing a consciousness of social worth. That is to say, to individuals who, because of the possession of a supposedly secret body of knowledge, consider themselves to belong to a distinct group and order, we express our ideas for the purpose of showing them that our possession of this knowledge gives us also the right to belong to the group. Secret societies afford examples of this. It is this insufficient motive which is most commonly used in school. The pupil recites in order to prove his knowledge of a certain fact which the teacher and the other pupils are supposed to know. He is not made to feel that

he may add to the total of knowledge or ways of control from his own experience.

Pedagogical Applications.—A brief application of this function may be made to the problems of teaching. *First,* the pupil writing compositions should choose his own individual topics on which to write. He should be advised to write superlative experiences. That is, he should choose the *most* interesting, the funni*est,* the sad-*dest,* the *best,* etc. These will be the most valuable to him and most likely to prove interesting to his audience.

Second, the pupil should have as his audience, not the teacher merely, but the class as well. If he is writing for the class he will be more likely to feel that his level on his particular subject is above that of his audience.

Third, the pupil should be taught not only to choose for his themes topics which are of value to himself, but he should learn to select from among such themes those which will be likely to prove of interest to his audience. This will help to keep him from being a bore in later life.

Fourth, the teacher should instill into the pupils the desire to tell him things about which he does not know, and should cultivate the habit of making the pupils aware that they are able to tell him things with which he is unfamiliar. There are some fundamentals, ignorance of which would be a shame to him, but there are countless other things to claim full knowledge of which would be sheer hypocrisy.

Forms in Language.—Forms are tools which the race has devised to make exact the communication of values through words. Each form is a tool with a specific func-

tion; it is built to serve a particular purpose subsidiary to the main function of language.

Pedagogical Applications.—Since forms are tools each with a specific function devised to help the child over specific difficulty, it follows without question that the form should be taught only when the difficulty, for the removal of which it was created, is *consciously* felt by the pupils. Why teach unity as a law of the paragraph if the pupil does not see that his failure to observe the law of unity results in his failure to make clear what he wishes to tell? Why teach paragraphing unless the pupil is made conscious of the fact that the thing of value which he wishes to share with his audience is mutilated because he does not paragraph? There is a reasonableness about forms which appeals to students as soon as they become conscious that language devoid of form is deficient in the fulfilling of the function of language. A fuller statement of a method of introducing forms so as to observe this principle will be found in Chapter 10.

Rhetoric.—The desire to see how we communicate values exactly has given rise to grammar and rhetoric. The term "rhetoric" is derived from the Latin, *rhetor*, meaning a teacher of oratory, a rhetorician. The function of the rhetor in Roman society was to teach rules by which disputants and orators might convince their audiences. The object in view was frequently the very practical one of convincing judges and common people that the line of action proposed by the speaker was the correct one to follow. In other words, the speaker had something of value, some way of acting, of settling a lawsuit, or of deciding political questions which he considered of sufficient worth

to be followed. Rhetoric was the compilation of the rules which would enable him to communicate his conviction most effectively. In this way a rather large body of rules was formulated; and to these we now apply the terms rhetoric and oratory, rhetoric dealing with structure of a composition, oratory with its delivery. We include within the compositions considered in rhetoric, not only those which are to be delivered from the platform, but also those which may be published through print. However, the two cases are similar. In each there is, *first,* the valuable experience to express; and *second,* the rules which will make the expression effective.

The study of rhetoric embraces the study of the forms of discourse, narration, description, argumentation, exposition, and of the paragraph. The function of all of these is to set forth some idea, the solution of some problem thought to be valuable. In narration, the purpose is not simply to tell a story, but to embody in the story some idea possessed by the writer, to use the story as a means of illustration, the "idea" being the meaning of the illustration. If the writer does not choose to use narration to set forth this idea he might use description, argumentation, or exposition, each in its own way being capable of conveying the all-important idea (or solution). The function of the paragraph in this connection is to set forth the individual units that are to be used in the handling of the solution or idea.

Grammar.—The function of grammar is to set forth the rules *by which words are related in sentences* in order to convey values with *definiteness and ease.* The original form of the sentence with very young children is somewhat analogous to our present interjection. In its early

form the sentence is composed of a single "word" which contains within itself rather indefinitely, the experience which is to be communicated. Later, this one "word" is, under the growing desire to be more definite and facile in speech, broken up into all the grammatical forms which are evolved and utilized by the adult. For instance, the pronoun probably arose from the desire to have not only greater definiteness, but also greater ease of expression; and the adjective arose from a desire to make the implication contained within the substantive more definite, as, for instance, when instead of directing a person to *a* house, we direct him to the big, red, brick house.[1]

Pedagogical Applications.—If each grammatical form, even the most subtle, has been created by the race to express values more definitely or more easily, it follows that functional rather than structural grammar should be taught. The history of the sentence in its rough outlines should be followed in detail sufficient to set forth the problem of grammar, viz., the securing of definiteness and ease. Then no form should be taught without the class seeing how it aids in its own specific way the accomplishment of either of these aims.[2]

Punctuation.—The generic function of punctuation is the same as that of its parent, language; it helps to communicate values. Its specific contribution is that of helping to convey relations and connections in thought by means of certain arbitrary symbols called punctuation marks. And each of these marks has a specific function

[1] Cf. Chapter 15 (Illustrative Lesson on the Adjective).

[2] For an attempt in high school work to carry out the view stated here, see Scott & Buck's "Brief English Grammar," Scott, Foresman & Co., Chicago, 1908.

which may be found tabulated in any text-book on punctuation.

Pedagogical Applications.—If each mark indicates a certain kind of relation, it follows that the marks cannot be efficiently taught as tools of communication if the child cannot see their intrinsic utility. For instance, the comma cannot be insisted upon by the teacher, nor utilized by the pupil except in certain conventional situations, until the pupil is able to appreciate the relation which it is meant to express. And since the comma expresses the most subtle relations of any of the punctuation marks, only its simpler uses should be taught or insisted upon before the eighth grade of the elementary school.

Reading.—Reading is similar to language except in one particular. The *reader* does not express his valuable experience in his own words. He accepts the words of another and to that extent only he makes them his own.

Hence, general methods for teaching reading are identical with those for teaching language. Other things being equal that reading will be most efficient which communicates something of value to another person who, though able to appreciate its value, has not come into possession of it. In other words, reading is most efficient when the reader presents something, which to him is valuable, to an audience which is sympathetic but lacking in the full knowledge of what he presents. The fact that the great bulk of the reading in the public schools transgresses these three conditions is so common as to escape notice.

Writing and Spelling.—The function of handwriting is essentially to record valuable experiences *in written symbols* for the purpose of communication, and thereby

to secure control of something of value. Legibility, and, to a lesser degree, speed, are the essential characteristics. Writing fulfills its intrinsic function when it promotes with facility the transfer of experiences. The function of orthography is to *arrange letters in words* in the order decided upon by social usage, all of which is intended for the purpose of accurately communicating valuable experiences. The penalty for incorrect spelling is *essentially,* not the stigma of being uneducated, but the failure to give thought correct expression. A phonetic or simplified spelling is justifiable on the ground that it will be less likely to endanger inaccurate communication than is our present involved, conventional orthography. The objection to phonetic spelling, that we miss thereby the historical markings of words, does not decide the essential point at issue. The question must be settled upon the grounds of increased facility of communication. Only in so far as the ability to see the derivation of words adds to accuracy of expression, can this objection be considered as an argument against changing to a phonetic system.

Section 3. History.

The intrinsic function of history is to *real*-ize the past in such a way as to help us appreciate and get control of present values. Or, to put it in other terms, history is studied to (1) get a picture of the past in order to (2) understand the present.

History may be studied for its own sake, or as an instrument for understanding the present. They who study it as an end in itself are concerned only with the past; its relations to the present are secondary and subsidiary to this other aim. They claim that the function of his-

tory is to *real*-ize the past, and that present conditions, problems, and activities are of use in so far as they assist in this process. History is from this point of view a value in itself, worthy of being controlled for its own sake.

When history is studied as an instrument it is considered to be of value chiefly because it provides one means of interpreting the present. Only those situations and facts in the past will be selected for discussion which have close bearing upon the present. They must, of course, be *real*-ized. They must be built up, but only to a degree sufficient to throw light upon modern institutions and problems.

Whichever view of history is adopted, a psychological statement of history will warrant us in saying that in both the past and the present there are values to be controlled, and that each generation devised means of securing this control. Hence, in both past and present the race has been busy solving problems, and every situation in history may be viewed as an attempt to solve one or several problems with the data which that particular group of people had at hand. Moreover, many of these problems are common to both past and present. The problem of government is of this perennial type. Each generation has tried to find a better solution than that of its predecessor and in turn has left its work as a heritage to the generation which followed. In fact, all the great problems of society are continuous, and by following them from their early beginnings we can see how their solutions have been evolved, and how the problems themselves have been modified by changing conditions. By tracing these problems from their fundamental form while keeping constantly *in view* the present form of the solution, there it little

danger of restricting the function of history to the *realization* of the past, and thereby destroying much good that could be gained from it.

Pedagogical Applications.—If, when we discuss movements and institutions, we view them as solutions of problems, and if we think of each situation in history as having some problem within it, we bring the history more vividly into the lives of pupils than if we view the situations as merely collections of facts. The element of reason and judgment then enters to illuminate or vivify the content of memory and imagination. Then we may view the continuity of history as a continuity of these problems, the problem and solution being affected in each situation by the entrance of such new factors as make changes necessary.

Section 4. Geography.

Geography helps us to get control of values by relating them to physical environment. When we study the industries of a city, visit its shops and see how the operations are there carried on, we are not necessarily studying geography. It becomes a geographical study only when we relate these processes to their physical environment. When we study the races of men scattered over the globe we are not necessarily studying geography. We study geography when we relate the races of men to the physical environment in which they are found, and try to explain their characteristics in terms of that environment. When we study the wealth, commerce, and industries of a country, that in itself does not constitute a study of geography. Such objects of study become geographical only when we seek to explain them in terms of their physical environ-

ment. And lastly, when we study the products of a country we are not necessarily studying geography. We may be studying botany or economics. The study becomes geography only when we explain these products in terms of such physical environment, as temperature, moisture, etc., which determine their existence.

Originally the only control which geography gave was that secured by stating *where* the thing of value was to be found. More recently geography has taken as an additional function that of explaining in terms of physical environment *why* a thing of value is found in the particular *where* in which it is located. This, of course, adds materially to our ability to control a value; because, for instance, if we know why it is located in one *where* we can the more easily find some *here* in which we might locate it, and thus save time and effort in securing it when we need it. It is well to know that silkworms thrive in France. It is better to know in terms of physical environment why they thrive there, because then we have some hint of the localities in America where they will thrive, or for determining, possibly, that there are no localities in America where they will thrive. We can then, in the one case, select the proper place, and in the other case, avoid wasteful experiment.

Conclusion.—Enough subjects have been discussed to illustrate the intrinsic functions of the various kinds of subject-matter. More cannot be given because of the limits of space. Students for the first time beginning to study the theory of teaching, are advised to study each subject and determine what specific sort of control it attempts to furnish. Just as geography seeks to get control of values by relating them to their physical environment,

and history, by relating them to the past, so physics endeavors to get control by considering them as forms of force and energy, chemistry by viewing them as made up of ultimate (chemical) elements, and art by viewing them from the æsthetic standpoint. And so, in like manner, every other subject performs its own specific, fascinating function.

CHAPTER V.

THE STRUCTURE OF SUBJECT-MATTER.

Definition.—A structure is defined as an organization of parts or elements for the purpose of fulfilling some function. It consists of two factors, parts and the organization of those parts. Both are correlates of function. That is to say, if we consider a unit of subject-matter, as for instance a lead pencil, the parts are lead, encasing wood, and probably rubber. They are not a structure. Organization is necessary that they be such. But both the organization and the parts are mainly dependent upon the function, upon the problem to be solved. Let us suppose the function is to carry on the writing process with ease. Evidently the organization and the parts selected must be determined by this end. The lead must be not too soft nor too hard. In one case it would require frequent sharpening (not conducive to ease); in the other case, the fingers must press too hard and at the expense of ease. Wood is put outside in order to protect the fingers from being discolored, to make the surface large enough to be grasped easily and to keep the brittle graphite from breaking (thus saving trouble). The rubber is attached at the end in order to avoid the picking up of an eraser which may easily be lost.

Parts and Organization.—We are well acquainted with the organization of parts in the "outline." When

an outline is made, the purpose is to present in compact form the most important parts of the structure. First comes the statement of the function, sometimes called the "topic." And then follows the outline, or structure.

The topic is always the solution of some problem or the satisfaction of some need. For instance, the topic *"An Ostrich Hunt"* is the attempt to solve the problem, "How is the ostrich hunted?" The solution is as follows:

Because of the ostrich's swiftness many devices have to be used in hunting it.

(a) In South Africa, they are hunted by horsemen who seek to tire them down.

(b) The Bushmen build an imitation ostrich upon their shoulders and thus are able to approach close enough to shoot the ostriches with poisoned arrows.

We meet in arithmetic, also, with the organization of parts to carry out a function. The problem, Find the cost of constructing out of inch lumber a box 4 ft. long, 2 ft. wide and 1 ft. deep, inside measurements, without a top, lumber costing $25.00 a thousand, has the following organization for its solution:

Area of sides $= 2 \times 4\frac{1}{6} \times 1 \times 1$ bd. ft. $= 8\frac{1}{3}$ bd. ft.
Area of ends $= 2 \times 2 \times 1 \times 1$ bd. ft. $= 4$ bd. ft.
Area of bottom $= 4\frac{1}{6} \times 2\frac{1}{6} \times 1$ bd. ft. $= 9\frac{1}{36}$ bd. ft.

Total $= 21\frac{13}{36}$ bd. ft.

1000 bd. ft. cost $25.00.

$21\frac{13}{36}$ bd. ft. cost $21\frac{13}{36}$ /1000 of $25.00 = 53c.$

Structure and Logic.—It is a truism that every unit of subject-matter that is well constructed is logical in its construction. This means, *first,* that every part included

in the organization must be relevant to the function of the whole. As an example of a poor structure the following may be cited. A lesson upon *The Benefits of Commerce*[1] has the following structure:

1. It enables us to exchange things we have but do not need, for other things which we do need, but do not have.
   (a) Southern cotton growers have more cotton than they need, but do not manufacture cloth. The New England States manufacture cotton cloth but do not have the raw cotton. Hence an exchange is a benefit.
   (b) Tea grows plentifully in China and sugar in the West Indies. We do not raise these, but we do raise many things which the Chinese and West Indians do not raise so easily, and so an exchange is of advantage to both.
2. Water is very useful for commerce.
   (a) Cheaper for transportation;
      (1) ships carry larger loads than wagons,
      (2) ships float and therefore require little force to move them,
      (3) this is realized as a reason for constructing canals.
3. Railroads are of use in transporting commercial commodities.

The first division belongs to this unit. The second and third are irrelevant. They deal with "facilities for transportation," or some such question. If the author desired to keep them in his organization, he should have shown how they are benefits flowing from commerce.

[1] "Sander's Third Reader," (1853) pp. 87-8.

Second. All the parts most relevant to the function must be included. Here an illustration may be taken from any machine. Suppose in a sewing machine the needle is lacking, then the functioning of the machine will be impossible. Again, when the problem arises, Shall I buy these curtains for my window? When I organize all the facts and parts I may bring in cost, weight, etc., but leave out the question of harmony of color with the paper in the room. This may invalidate the whole organization. In choosing a business partner I may, in thinking it over, consider his honesty, sympathy, physical fitness, etc., and because I fail to think of his lack of aggressiveness the purpose of the partnership may be defeated.

Third. The structure of the subject-matter to be taught must be viewed as the *best* solution, most compact, most economical, and most expert that the race has worked out, and that the pupils can use.[1]

Pedagogical Hints.—To help the reader to find the *function* of any unit of written subject-matter several devices are used by writers.

First. Frequently it is indicated in the title. "The Benefits of Commerce," "An Ostrich Hunt," "The Origin of Species," "How Valmond Came to Pontiac," "The History of England," etc., all indicate function in a general way. Sometimes, however, little assistance is given by the title. *Macbeth, Sandolphin, Lady Clara Vere de Vere,* do not indicate in any exact way what is to be the specific function of the selection.

Second. The introduction to a selection and the topical sentence of a paragraph frequently give specific assistance in finding the function.

[1] See Chapter 15.

Third. Certain devices are used in text-books, such as subject headings and marginal headings. Considerable use of all three of these devices is made throughout this text, as a rapid leafing of the pages will show.

Fourth. It should be noted that, particularly in literature and music and art, it is sometimes impossible to adequately express the function in words. Critics who try to do so do not always agree, and probably the creator of the work could not state its precise function. The thing he wishes to express may be so large, so indefinable, or so largely a matter of feeling that one statement will not do it justice. Indeed, the fact that literary criticism frowns upon the moral at the end of a poem, and the fact that art critics object to the title's being too specific seem to indicate that it is not always wise to try to state the function even when it might be done.

Academically this is correct. Practically in dealing with immature children the teacher makes no serious mistake in giving what seems to be the best statement of function, and in then organizing the work of art to show how the function is fulfilled. This course does not mean that he need show the subtleties of technique by which the result was secured, but rather to lay bare the main divisions of content, going into detail as far as the maturity of the students will warrant. Outside of the æsthetic field, there is usually little difficulty and there is no objection to stating the function in concise form.

Explicit Relations.—In making an outline of the *structure,* it is well for teachers to make the relation of parts to the central function explicit. It is not always sufficient to merely have the relation in mind. To ensure

the proper teaching of the relations it is advisable to actually state them. As an illustration the two following forms of outline may be given. Let us suppose that the function of a study of English history is "to show the formation of a popular national government of a representative character." The outline may be made as follows:

I. Anglo-Saxon government (to 1066).
II. Norman and early Plantagenet government (1066-1215).
III. Later Plantagenet government (1215-1485).
IV. Tudor government (1485-1603).
V. Stuart government (1603-1688).
VI. Modern English government (1688-date).

Or it may be made in this way:

Function: To show the formation of a national popular government of a representative character.

Structure: I. Anglo-Saxon government (to 1066), which shows in the earliest form of the government strong local and weak central institutions.

II. Norman and Early Plantagenet government (1066-1215), which describes the establishment of a monarchy so strong that it over-rides the local institutions.

III. Later Plantagenet government (1215-1485), which describes the rise of parliament but its failure to control the monarchy.

IV. Tudor government (1475-1603), whose significance is that in this period the people acquiesce in a strong monarchy because of commercial and religious interests.

V. Stuart government (1603-1688). This describes the victory of parliament over an absolute monarchy, and the definite establishment of a constitutional monarchy.

VI. Modern English government (1688 to date), which exemplifies the manner in which a strong central government is based on strong local institutions.

A statement of this latter sort made by the teacher will convince him as nothing else will that he has a logical organization. With such a statement he will be in less danger of going astray in his work from day to day. And this is the more certain if the principle is applied also to divisions subsidiary to these main divisions. Here the same procedure should be followed. The relation of the central theme should be stated clearly. Suppose we choose any one of the divisions stated above and make an outline for it.

IV. The Stuart Government.

Function: To show how absolutism was over-thrown and a constitutional government was definitely established by the people of England (as one of the steps by which a strong national government of representative character was established).

Structure:

1. The Crown and Parliament (1603-1640). Its significance is that it throws into strong relief the opposition between the royal prerogative and constitutional power.

2. The Privy Council. This exemplifies a method by which the executive tried to make itself stronger than parliament.

3. The Constitutional Revolution (1640-1649).

This is the violent demonstration by parliament of its right to control the monarchy.

4. The Military Despotism (1649-1660). Its significance is that in the throes of readjustment the parliament was supplanted by a military despotism.

5. The Restoration Government (1660-1668). This exemplifies the unwilling compliance of the monarchy to constitutional forms.

5. The Restoration Government (1660-1688). This shows the successful and permanent assertion by the people of their right to constitutional government.

Such a statement as this, in so far as it is explicitly a statement of the bearing of each sub-head upon the function of the large division and upon the function of the whole organization, will, as said above, help the teacher to get the proper perspective. It will keep him from introducing irrelevant material, and from emphasizing unimportant points in the history.

Relativity of Function and Structure.—The structure varies with the function. For instance, if we make the function of American history the portrayal of deeds of heroism, we would naturally organize a structure upon that basis. We would select all the deeds of heroism and would neglect other facts. But, if the function is made that of showing the organization of independent local governments into a strong federal government, we would select our facts from a different basis. Many of the facts that would be used in the former case would be omitted in the latter case; many others would be added, and each would have an emphasis placed upon it in harmony with the function.

On the other hand the function is dependent upon the structure. For instance, in American history we cannot make the function that of showing the growth of Oriental despotism, because the facts cannot fulfill that function. And likewise, it is a sad wrenching of the structure to make the study of literature that of exemplifying rules of grammar. The poem was not intended for that; the structure will not bear such a function without destroying itself. Again, we cannot use a feather to drive nails. The feather can be made to serve only those functions which are consonant with its structure.

Units of Subject-Matter.—The term "unit" is used in connection with subject-matter to indicate a relatively distinct portion of a subject. We speak of each unit of subject-matter as being an instrument designed for a specific purpose. But the difficulty is that the term may be applied in such a way as to lead to confusion. For instance, in the illustration in English history given above, we have six units in the whole. But we may also use the term in describing the sub-divisions under IV, and state that these are six units.

Large Units.—We cannot speak of the smaller units as recitations, because frequently two or three recitations may be occupied in the study of one unit. Hence probably the best we can do is to use the term "large unit" for these larger divisions, and the term "unit" for the smallest units that are taken up as relatively complete and distinct divisions. In the subject just referred to we may then say that there are six large units, and six units in the fourth large unit. But at best the terms are relative.

Units and Recitations.—Usually one recitation is

taken up with one unit. Frequently several recitations are needed to get control of one unit. Sometimes two units or more may be taken up in one recitation. No rule can be laid down as to the amount of subject-matter to be covered in a recitation, unless the one who makes the rule knows the class and the subject-matter.

CHAPTER VI.

EXAMPLES OF FUNCTION AND STRUCTURE.

SECTION 1. EVERY UNIT OF SUBJECT-MATTER HAS A FUNCTION WHICH ITS STRUCTURE IS ORGANIZED TO PERFORM.

Hygiene.—"And now, what becomes of this breath which passes from your lips? Is it merely harmful; merely waste? God forbid! God has forbidden that anything should be merely harmful or merely waste in this so wise and well-made world. The carbonic acid which passes from your lips at every breath—ay, even that which oozes from the volcano crater when the eruption is past—is a precious boon to thousands of things of which you have daily need. Indeed there is a sort of hint at physical truth in the old fairy tale of the girl, from whose lips, as she spoke, fell pearls and diamonds; for the carbonic acid of your breath may help hereafter to make the pure carbonate of lime of a pearl, or the still purer carbon of a diamond. Nay, it may go—in such a world of transformation do we live—to make atoms of coal strata, which shall lie buried for ages beneath deep seas, shall be upheaved in continents which are yet unborn and there be burnt for the use of a future race of men, and resolved in their original elements."—Charles Kingsley.

Function: The function of this subject-matter is to answer the question, Is breath exhaled merely waste?

Structure: The answer is, No. The reasons for it are the following:

1. The general one, that it is not according to the economy of God's laws.
2. That it is a boon to nature. This is illustrated by stating that it may produce:
   (a) vegetation,
   (b) pearls,
   (c) diamonds.
   (d) coal.

Literature.—From *Cymbeline,* by Shakespeare.

"Hark, hark! the lark at heaven's gate sings,
And Phoebus 'gins arise,
His steeds to water at those springs
On chalic'd flowers that lies;
And winking Mary-buds begin
To ope their golden eyes;
With everything that pretty is,
My lady sweet, arise;
Arise, arise!"

Function: To portray the state of mind of a lover in his effort to awaken his lady-love.

Structure: This may be analyzed as follows:

1. The intellectual content is expressed in his arguments. He calls her to awaken because:
   (a) the lark is singing,
   (b) the sun is rising,
   (c) the flowers are opening,
   (d) everything that is pretty is rising,
   (e) it is time, therefore, for *you* to arise.

2. The emotional quality is expressed as follows:
   (a) The stimulating beauty and the joyousness of the morning, as felt by the lover, is expressed by:
      i. The magnificent imagery in which his arguments are clothed;
      ii. The exhilarating rhythm.
   (b) His love for his lady is suggested in:
      i. "With everything that pretty is,"
      ii. "My lady sweet."
3. The keenness of his desire is shown by the use of the staccato calls:
   (a) "Hark, hark!"
   (b) "Arise, arise!"

Function and Structure in Arithmetic.—Arithmetic affords an excellent example of units of subject-matter which have a very definite function and a very definite structure. For instance, if we start with the function of arithmetic, and state it to be the providing of methods for measuring quantity, we can at once see how the different processes assist in fulfilling this function. For example, the function of addition is to provide a means for securing the sum of like quantities. The function of multiplication is to provide a short method of adding, and the function of the multiplication table is to facilitate the process of learning the multiplication facts. The function of fractions is to provide a means of computing quantities whose unit is less than 1; and among these we have decimals with the function of providing a peculiar and easy method of handling all fractions having as denominator 10 or a power of 10. In the same category come denominate numbers whose function is that of providing a method of handling quantities whose units are what are technically

known as "measures." Similarly, percentage has as its function the manipulation of certain quantities which can be handled most easily by computing them in terms of 100. A promissory note has for its function the recording definitely in writing of a promise to pay. Interest has as its function the computing of the amount to be paid for the sum borrowed. In the same way each of the processes of arithmetic may be shown to be a tool whose function, or purpose, or use is to help in the computation of arithmetical quantities.

Furthermore, each of these processes has a structure, that is, a way of working which helps to carry out its function. If we examine addition we find that we have integers and decimal notation to carry it out. Multiplication is constructed with its integers, its decimal notation, and its dependence upon memory for the sums of certain like quantities, by which it performs efficiently its work of shortening addition. Likewise, the promissory note has many ways of safe-guarding the transaction of borrowing money, such as the date and time to run, the rate of interest, the amount written in words as well as figures to avoid error, and the signature of the borrower. These which make up the structure of the promissory note all help to make it a safe method of recording financial transactions.

And so with every process. The function being determined, the structure follows freely. The teacher should take every process in arithmetic and view it in this functional way, so that each will be viewed as an instrument which has its own peculiar value in certain surroundings. For, just as the tack hammer can do certain work better than the carpenter's hammer, so the carpenter's hammer

can do better work in some conditions than the trip hammer. Each of the processes of arithmetic has its own peculiar field to work in, a field in which it is of most service and most easily applicable. Each process is a tool just as much as a hammer is a tool. And further, just as the tack hammer has one kind of structure because its function is to drive tacks, while the trip hammer has another structure because its function is to crush steel, so it is with each process in arithmetic. Each has its own way of acting, its own structure which has been built up by the race with infinite care to perform the work for which it was created.

Spelling.—

rare	worthless	willing
exit	disperse	rejoicing
plenty	sullen	separate
advance	miser	money

Function: To provide an exact form by which to symbolize each idea.

Structure: These words are built up by the organization of letters which unfortunately do not follow any logical order. Their structure has been determined by convention, and has to be accepted as it is. The structure consists in the order of the letters.

believe	receive	reprieve
grieve	achieve	sieve
conceive	retrieve	sleigh
feign	deceive	neigh

Function: The same as in the preceding group.

Structure: The structure of the words follows a def-

inite rule (with exceptions) with regard to the use of the i and the e. That is to say, the order of the i and the e is determined by the following rule: "i before e, except after c, or when pronounced like a, as in neighbor, and weigh."

SECTION 2. IN THE ORGANIZATION OF NEW SUBJECT-MATTER THE FUNCTION IS FIRST DETERMINED AND THE STRUCTURE IS BUILT UP TO PERFORM THE FUNCTION.

English History.—It is of course clear that the method of organizing units of subject-matter *de novo* should be the same as those which have been found in subject-matter already effectively organized, and illustrations of how this may be applied to history and theme-writing will be sufficient. In the first place the function of the whole course is decided upon. Let us suppose that in English history we wish to make the subject-matter serve the function, inadequate though it be, of showing the rise in governmental power of the common people of England. When we proceed to organize our subject-matter we have a well-defined line to which to hew. There is a vast array or accumulation of facts which are of interest, some for one purpose, some for another. But we may choose only those events which had an influence upon the rise of the common people in governmental power. We can, for instance, determine to what extent and from what standpoint to study the wars of England. For example, we would be concerned very little with the battles of the Hundred Years War, but would lay great stress upon the effects of the war in modifying the political power of the common people. We could profitably omit all the Wars of the Roses except the decisive battles, and

would retain those only as fitting centers around which to collect the political influences of the wars.

We can also determine the characters in English history upon which to lay most stress. The character of Simon de Montfort might receive more attention than that of Piers Gaveston. We are able, too, to determine the elements of the characters of the different sovereigns upon which to lay stress; for instance, those characteristics of King John which most angered his people would be most important, those characteristics of Richard I which enabled his people to gain more power would be significant ones, and those characteristics of Charles I which made the people restive under his authority should be selected. We see why certain periods should be emphasized and other periods treated briefly. For example, the period from 449 to 900 A. D., the reigns of Henry I, of Henry II, and of John, the Stuart period, and the period immediately preceding and succeeding 1832, should be treated fully in their political aspects. On the other hand, the Yorkist and the Tudor periods should receive relatively less attention.

The teacher then knows, and the children know, that their reason for studying the tenth lesson, or the twenty-fifth lesson, or any lesson, is to see how the growth in political power of the common people was affected by the events portrayed in that particular unit. And the pupils at the end of their study of English history should have their subject-matter organized in such a way that they can trace the development of this power from 449 A. D. to the present time, and state the conditions which have influenced the development, step by step.

Two things may be said in relation to the foregoing treatment of English history. (1) It is not necessary for us to assume that this is the best function that English history can serve. The points are these: the function must be determined, whatever it may be; and the teacher and pupils should have that objective point before them continually. (2) In so far as there are other facts in English history which may be of value but which have yet had no appreciable effect upon the determined function, they should be introduced, but they should be recognized as being incidental and relatively isolated from the trunk line of study.

Theme-Writing.—In writing a paper upon any topic the first step is to determine the problem which the paper intends to solve, or stating it in terms of subject-matter, the function of the subject-matter which is about to be organized. Then the pupil has to think out the main arguments or steps that he will use in solving this problem, and these will form the skeleton of the paper. Then each of these main arguments must be studied in detail to get facts to support it. Thus a more detailed outline for the paper is obtained and the paper will be completed by connecting the arguments and massing the details in appropriate language. Here, again, the function is of supreme value. It gives the standpoint from which to select subject-matter, and indicates the standard by which to judge the logical quality of the paper; for the function will check up every point, even to the minor ones, since anything irrelevant to it must be excluded, and everything that is relevant and reasonably within the experience of the pupil is expected to be inserted.

SECTION 3. THE SAME GENERAL SUBJECT-MATTER MAY HAVE DIFFERENT FUNCTIONS WITH CORRESPONDINGLY DIFFERENT ORGANIZATIONS.

Arithmetic.—The principle which is stated at the head of this section may be illustrated as follows: If we take the Fodder Tables and the Tables of Nutriment for a Day's Feeding and select a few facts, it is an easy matter to show how these may have different organizations when fulfilling different functions.

Fodder.	Pounds.	Dry Matter.	Protein.	Carbohydrates, etc.
Corn stover	10	5.95	.17	3.24
Clover hay	10	8.5	.71	4.2
Corn meal	1	.85	.063	.71
Cottonseed meal	1	.9	.45	.4
Wheat bran	6	5.1	.38	4.3

These figures refer to the constituent food products selected. For instance, 10 lbs. of clover hay contains 8.5 lbs. of dry matter and in the dry matter is found 71 lbs. of protein and 4.2 lbs. of carbo-hydrates, etc.

It is known, further, that (a) a milch cow weighing 1,000 lbs. and producing 22 lbs. of milk per day requires 29 lbs. of dry matter, including 2.5 lbs. of protein and 13 lbs. of carbo-hydrates per day, and (b) beef cattle from 18 to 24 months old, weighing 950 lbs., require per day 22.8 lbs. of dry matter, including 1.71 lbs. of protein and 11.4 lbs. of carbo-hydrates.

These seven facts may be organized differently, some being used in one proportion and some in another, some being omitted and some being utilized. For instance, if we wish to make a balanced ration for each of the kinds

of cattle mentioned we may have different organizations, organized as follows: *Function:* To make a ration for the milch cow referred to above.

Structure:

Fodder.	Pounds.	Dry Matter.	Protein.	Carbohydrates, etc.
Clover hay	10	8.5	.71	4.2
Corn stover	10	5.95	.17	3.24
Corn meal	4	3.4	.26	2.86
Wheat bran	5	4.4	.6	2.40
Cottonseed meal	2	1.8	.9	.8
Total	31	24.05	2.64	13.5
Standard	..	29	2.5	13

This provides a satisfactory balance of ration (slightly light in bulk). It is, therefore, an organization that fulfills its function.

For the second kind of cattle another organization of the fodder constituents is possible, as follows:

Function: To make a ration for the beef cattle referred to above.

Structure:

Fodder.	Pounds.	Dry Matter.	Protein.	Carbohydrates, etc.
Corn meal	8	6.8	.48	5.7
Cottonseed meal	1	.9	.45	.4
Clover hay	10	8.5	.71	4.2
Corn stover	5	2.97	.08	1.62
Total	24	19.17	1.72	11.92
Standard	..	22.8	1.71	11.4

This slightly different organization is made by the selection of another function to be fulfilled.

Geography.—Suppose we take the following problem: What are the effects of the motions of the earth relative to

the sun? In a general way, the subject-matter organized to answer this question may be considered to be composed of three facts: (1) the earth revolves around the sun in the plane of its orbit, once a year; (2) it revolves on its own axis once a day; (3) the axis of the earth is inclined $23\frac{1}{2}°$ from the perpendicular to the plane of the orbit.

Now, this subject-matter may be made to serve two purposes, among others.

(1) *Function:* To explain the seasons.

Structure: If we take any point upon the earth's surface it is evident that in the revolution of the earth around the sun there will be one time in the year when the rays of the sun are more nearly perpendicular to that point than at any other time. The sun's rays are most effective when they are perpendicular, and this gives rise to summer. At another time of the year when the earth is at the other extreme of the orbit, the rays fall most obliquely on that same point. Under these circumstances the heat rays are less effective, and this gives rise to winter. There are two periods during which the sun's rays are inclined at angles half way between these two extremes. The one of these that follows summer is fall, which is warmer than winter and colder than summer, and the other is spring, which is also warmer than winter and colder than summer.

(2) *Function:* To explain the fact that the days are longer in summer than in winter.

Structure: Consider any point in the northern hemisphere. In summer the sun's rays reach beyond the north pole, and will cover more than half the northern hemisphere. As the point revolves around the earth's axis, it will be in the sunlight more than one-half the time. Hence the days will be longer than the nights.

In these examples the three facts that were stated at the beginning, when amplified and illustrated sufficiently as in text-books on geography, usually contain the facts stated in the solution of the two problems. The point to be emphasized is that we may, if we so desire, take the organization of subject-matter made to fulfill an encyclopedic purpose and approach it from different standpoints, as in the instances just given. And a different organization of the original subject-matter will result as each of these different problems is successively in mind. In such cases we get a new organization by laying emphasis upon certain of the facts and subordinating the other facts found within the larger organization.

Literature.—The different functions that a selection in literature may serve are very well exemplified by the well known poem, *Excelsior*. From one standpoint, the function may be to illustrate the persistence of an ideal; from another standpoint, and this the standpoint of young children, it may be that of portraying the adventures of a remarkable youth. Upon the first basis we are fortunate in having Longfellow's[1] own statement of the purpose of the poem. (The author's statement is indicated by quotation marks.)

[1] Longfellow's "Poetical Works," Vol. 1, pp. 79 and 80, Houghton, Mifflin & Co., 1892 edition.

(1) *Function:* "I have had the pleasure of receiving your note in regard to the poem, *Excelsior,* and very willingly give you my intention in writing it. This was no more than to display, in a series of pictures, the life of a man of genius, resisting all temptations, laying aside all fears, heedless of all warnings, and pressing right on to accomplish his purpose.

Structure: "His motto was 'excelsior'—and 'higher.' He passes through the Alpine village —through the rough, cold paths of the world— where the peasants cannot understand him and where his watch-word is an 'unknown tongue.' He disregards the happiness of domestic peace and sees the glaciers—his fate—before him. He disregards the warnings of the old man's wisdom and the fascinations of woman's love. He answers to all, 'Higher yet.' The monks of St. Bernard are the representations of religious forms and ceremonies, and with their oft-repeated prayer mingles the sound of his voice, telling them there is something higher than forms and ceremonies. Filled with these aspirations he perishes, without having reached the perfection he longed for; and the voice heard in the air is the promise of immortality and progress ever upward."

The analysis from the second standpoint might proceed somewhat as follows:

(2) *Function:* To describe the adventures of a lonely, peculiar youth in climbing an Alpine mountain.

Structure: 1. Stanzas 1 and 2 show his loneliness by the terms 'strange device' and 'unknown tongue,' and his peculiarity is shown by his carrying a banner, his sad brow, and his flashing eyes.

2. Stanzas 3 to 9 tell of his adventures.

(a) Stanza 3—he passes homes, and his loneliness and peculiarity are shown by the fact that he sees the comforts of homes, but even though he is so lonely that he groans, he passes them by.

(b) Stanza 4—he meets an old man, and again his peculiarity is shown in his paying no attention to the dangers ahead.

(c) Stanza 5—he meets a maiden; again his loneliness is shown by the tears that come to his eyes, and his peculiarity by his still pressing on though with a sigh.

(d) Stanza 6—late at night he meets a peasant who warns him of other dangers. His peculiarity is shown again in his still pressing on.

(e) Stanza 7—shows him in the morning away up the mountain side; his loneliness is shown again by the expression, 'the startled air.'

(f) Stanza 8—depicts him as finally dying, alone, frozen, and his peculiarity is further shown by his still grasping the banner in his hand of ice.

(g) Stanza 9—again shows the strangeness of the youth in that, as he lay there, a

strange event occurs, "that from the sky a voice fell like a falling star, Excelsior."

It is undoubtedly true that many children who read the poem, *Excelsior,* appreciate only this latter rather meager function. But waiving the question of the advisability of teaching the poem to children who get nothing more than this out of it, it furnishes a good illustration of how literature may serve some other function than that which the author primarily intended.[1] Oftentimes in the exposition of his deeper meaning he uses illustration and allegory which to the discerning mind are seen to be merely the vehicles of his meaning, but which to one not so discerning become the whole content of the idea. An excellent example of this allegorical presentation of meaning is furnished by Bunyan in "Pilgrim's Progress."

[1] See Chapter 3.

CHAPTER VII.

THE TEACHING OF SUBJECT-MATTER.

Section 1. The Peculiar Problem of Teaching.

What has been said up to this point concerning subject-matter has had only an indirect bearing upon the problems of teaching. To every person, whether he is to be a teacher or not, there exists both function and structure of subject-matter as it has been described. We have been considering these almost entirely apart from their pedagogical relations; at this point it becomes necessary to consider their bearing upon the problems of teaching.

We teach when we transfer our ways of doing things over into the experience of some one else. In other words, the teacher must not only know how to do things, but must also know the content of the experience of the one taught. The distinction between doing and teaching is at once evident. For instance, when the housewife proceeds to teach an untrained servant how to make bread, the process of teaching differs from the process of bread-making in that the housewife, as teacher, has to translate what she does into the terms of the experience of the one taught. We say ordinarily that she has to make the servant understand. But this means that the making of bread has to be stated in terms of what the learner already knows.

Difficulties.—That this is sometimes a difficult thing to do becomes evident when, in terms of the foregoing illustration, we think of the mistress endeavoring to teach an untrained domestic. The domestic either has very little content of experience, i. e., is ignorant, or she is so different from the mistress that the latter cannot get an understanding of what she really does know and think. To illustrate further, take the case of the specialist in science who endeavors to teach. He may be able to solve the problems of his laboratory with the greatest skill possible, but that does not necessarily mean that he can *teach* his methods with equal success, for the new element enters, viz., that of translating his methods over into the content of the mind of the learner.

It must be acknowledged that with many people who teach, the real problem of teaching does not arise. That is to say, they merely state the process by which they arrive at conclusions, if the problem is an intellectual one; or merely perform their methods, if the problem is a manual one, and make no effort to translate the thing they are doing into the experience of the learner. In this case one of the three results follows. The learner may not at all grasp the teacher's method of doing things. Or, he may grasp it at once because the content of his experience is like that of the teacher. Or, after a process of hit-and-miss understanding, he may finally come to a point where his content is sufficiently like the teacher's to enable him to understand the teacher's methods. The teacher remains in his own world, and to the pupil is relegated the duty of coming into that world.

This explains why the teacher who as a student was quick or brilliant is frequently less successful in the be-

ginning of his professional career than is his companion to whom learning was a much more difficult process. The latter is nearer to and better understands the content and ability of the minds of his pupils. This also explains why the teacher with intellectual and emotional sympathy has an advantage over the teacher who cannot appreciate the standpoint of other people. The former has the habit of feeling with the pupil, the latter has the habit of living within his own world. Some teachers are born with an intuitive feeling for the standpoint of children, others have to achieve it by laborious effort, and still others fail to attain it.

Differences Between Teacher and Pupil.—That there is a wide difference between the content of the experience of teachers and pupils is undisputed. The studies of G. Stanley Hall[1] reveal very clearly the tremendous gap between the adult mind and that of the child entering school. They show, also, the great difference in the content of the minds of children reared in urban and in rural communities. The same fact will be impressed upon any teacher who will take the pains to have answered by the pupils beginning the study of any subject twenty-five questions about facts which the child will be expected to learn in the course.

Recently the writer asked a few questions of students in the high school who were about to begin the study of physical geography. Out of 41 pupils answering, 16 did not have any clear idea of longitude; 9 did not know where water vapor comes from; 9 did not know which is the east side of the map; 21 thought the sun goes on

[1] "The Contents of Children's Minds on Entering School," Ped. Sem., Vol. 1, pp. 179, et seq.

the other side of the earth at night; 19 did not know what is meant by the axis of the earth, one stating that it is the imaginary frame upon which the earth turns; 10 did not know of what coal is made; 13 did not know that thunder and lightning occur together, one of these believing that "thunder comes first before lightning as a warning, for lightning does the harm"; and 29 knew of no relationship between the tides and the moon. This is all the more surprising because all these facts had been studied in the grades, and the pupils averaged in age about 17 years.

Stories about children, also, emphasize this difference between the standpoint of children and of adults. The adult has been living so long in his own world and thinking so little about the child world, that children's ways of viewing things are intelligible to him only after definite effort to recall and understand them. The proverbial mistakes of children in examinations, which constitute the stock jokes of examiners, emphasize this difference. Supervisors of practice teaching will support the statement that one of the most persistent weaknesses of practice teachers is that they take too much for granted, and any supervisor can recall multitudes of instances in which the practice teacher will excuse himself by saying, "Why, I thought that *anybody* would know that."

Necessity of Sympathy.—That there is need for both emotional and intellectual sympathy with the pupil is incontrovertible. We have seen that knowledge grows by the reorganizing of experiences. Teaching is not a pouring-in process. Facts cannot be hypodermically injected. The teacher may think that he has performed such an operation, but he may rest assured that no matter

what the fact means to him, its meaning to the pupil is determined by the facts which he already possesses, and by the relations which the new fact sets up with what he already knows. Even when the teacher thinks that he has translated his subject-matter into terms of the child's experience, he may find that a different meaning from that intended has been given. This calls to mind the case of the teacher who laboriously endeavored to make clear the nature of a volcano by building up a cone of sand upon the sand table, and having made it realistic by lighting some decapitated firecrackers in an aperture at the top, rested content with his illustration. His feeling of complete defeat may be imagined when the next day one of his little boys said, "Please, teacher, may we have some more of the fireworks to-day?"

The concept of apperception emphasizes this same fact. Whatever may be its shortcomings, it has succeeded admirably in showing us that new ideas are interpreted in terms of old, that nothing absolutely new can be added to experience like potatoes to a bin, but that each idea apprehended must be apprehended in terms of what is already present, even though on that account wrongly apprehended. For a good little monograph on this subject, read Rooper's *Pot of Green Feathers.*

This necessity is further emphasized when we reflect that the inexperienced teacher is farther removed from the child's standpoint than is the average individual. The teacher is highly intellectualized; he is a student of books; he has the habit of analyzing his ways of thinking and acting, and of performing this analysis in a highly abstract way. His vocabulary is generally literary and scientific; his world is scholarly. The average individual,

on the other hand, is concrete in his thinking, he has an unscientific vocabulary, he thinks in empirical terms. The teacher, therefore, must make greater deliberate effort to get on the level of his pupils than would the average individual. He must at times deliberately step out of his own world and enter that of the child if the latter is to be led back with him into his larger world.

What we have been saying applies to the teaching process in general. The preacher who teaches religious truths, the political campaigner who convinces his audiences, the father who explains facts and principles to his child, the merchant who shows the new clerk what to do, the musician who touches the hearts of the people, all must translate the thing they wish to teach over into the experience of those whom they are trying to teach.

Another Function of Teaching.—The school as a specialized agency of instruction performs another task. Not only does it translate experience, but it also makes selections from the multitude of experiences worthy and capable of being translated. That is to say, it picks out the great typical experiences of the race, the important problems which the race is working upon and is attempting to solve, and presents these to the pupils in their simplest and therefore most usable and effective form. For example, from all the mass of grammatical rules it selects the fundamental principles, and, freeing them from their detail, gives them in their simplest form to the children for assimilation.

In conclusion, we may say that the peculiar problem of teaching is that of translating our ways of thinking and acting over into the experience of children, so that what they may think and act in a similar or a better way.

SECTION 2. AIDS TO THE SOLUTION OF THE PROBLEM OF TEACHING.

The query now arises, What has the theory of teaching to offer as an aid in securing a knowledge of the experiences of pupils? To what sources may the teacher turn in order to get an understanding of the content of children's minds?

Introspection.—In spite of the wide gap between the experience of the adult teacher and that of the child, the most fruitful source to which the teacher can turn is his own experience. When the teacher is trying to foresee the difficulties that the child will meet in grasping the problem upon which he is bent, and to forearm himself with methods for removing those difficulties, he is forced in the last analysis to consider what he himself finds to be the difficulties. If he is to teach problems in arithmetic he studies them with a view to finding out what are the crucial points—the points that are likely to give difficulty to the pupils; and in doing this he has no other recourse than to his own experience, unless it be to the recollection of the difficulties that former pupils have had. And again, in determining the best way of explaining the difficulties to the children from among various methods which may suggest themselves, he makes choice according to standards of clearness and simplicity as set up by his own mind.

This, of course, implies that in his introspection he imagines himself, as well as he can, to be in the pupil's place, with the pupil's standpoint and degree of development. In other words, in this introspection he examines his child self rather than his adult self.

The same principle applies in discipline. When the teacher has a problem in discipline, and is seeking for the

best way of handling it, he again appeals to his own experience, and particularly to his child self. He considers the question,—Does this plan that I am about to follow appeal to me as fair? Would it have helped me into the proper attitude toward some one in authority over me when I was a child? Would it have produced the proper results upon me if tried by some one else? In other words, the value of sympathy to the teacher is essentially that of being able to make his experience congruous with the pupil's, in order that by introspection he may decide what, to his congruous experience, seems the most satisfactory thing to do. This ability to vividly recall childhood in all its phases and sentiments and little judgments is admirably presented in the early part of "David Copperfield."

Psychology.—Another aid which has been overrated by some and underrated by others is psychology. This subject aids the teacher because it gives a scientific account of the ways in which experience operates in securing efficiency. It is important because it is scientific. It aids untrained introspection by helping it to see the great and fundamental processes that operate in experience. A teacher is unwise if he pays no attention to it, because it is clearly evident from the long history of psychology that no one man, even of commanding intellect, is able unaided to discover all these processes. A great army of men have spent their lives investigating these things and giving a scientific account of them. And no teacher with the multitudinous duties of the school room to hamper him, is able to get without help as clear a conception of the working of the mind as he can get by utilizing the fruit of their labors. If he does not use it, it is as though

he kept his capital idle instead of investing it. Moreover, psychology will give him certainty that he is not setting up artificial aims, and that he is not using ineffectual and perverting methods.

Psychology has three fields which are of value to the teacher. *First,* general psychology, which treats of the mental processes of the normal adult; *second,* educational psychology, which applies the principles of other branches of psychology to educational problems; and *third,* genetic psychology, which treats of the growth of the content and processes of experience. The chief merit of genetic psychology is that it emphasizes the fact that at different ages the child has a different content of experience, is dominated by different interests, and possesses varying fineness and persistence of activity.

Theory of Method.—Another aid in solving the problems of teaching is found in a study of the methods of teaching. Essentially, a study of teaching is reflection upon the way that subject-matter grows and organizes itself. It differs from psychology in that, while psychology treats of the child in terms of the processes of experience, such as memory, imagination, etc., methods of teaching deal with the ways in which the child gets control of subject-matter. For pedagogical purposes they both deal with the same great problems and are closely interrelated, being two aspects of the same thing, but differing in the point of view from which each is studied. The great problems of the theory of method are essentially those of the organization of racial subject-matter, of getting the child to start to work upon subject-matter, of getting him to organize his subject-matter, and of applying these organizations to the handling of other units of subject-

matter. And, as we have said, in working upon these problems the teacher reflects upon his own methods of organization, upon the way in which racial subject-matter is organized, and, finally, studies, by means of practical experience, the ways in which subject-matter is organized in the experience of everybody, especially children. As a result of this reflection he arrives at the principles of pedagogy and methods of teaching.

Practical Experience.—All the aids that we have mentioned may be well in hand before any practical teaching has been engaged in. They are part of the equipment with which professional schools should provide the teacher. But let the inexperienced teacher try as he will, he is sometimes unable to build up within himself an experience in harmony with that of his pupils. The difficulties which he imagines may be only a few of the many difficulties which the child may have. The method of explanation which seems perfectly obvious to him may be turgid to his pupils. The methods of discipline which seem fair to him may to the child seem unfair; even his child self may be too mature to approximate very closely to the pupil's experience. Moreover, his study of psychology may have given him a knowledge of the principles of psychology without giving him a knowledge of their peculiarities of combination in individual children, and his principles of pedagogy and methods of teaching may be merely principles and methods which, so far as he is concerned, have yet to be tried on in actual practice. He has not as yet met the child on his native heath; he has verified the principles which he has accepted merely by an appeal to his own experience, or by an appeal to the records of child experience contained in books. He has,

therefore, many problems to overcome before he can translate his experience, his knowledge of the world, and his attitude toward life, over into the experience of the children who now, for the first time, are actually before him. At this point practical experience enters as the last aid in helping him solve this problem.

Practical experience is of so much importance that some have claimed that it is the most important factor in the making of a teacher. But in considering this statement we have to distinguish clearly between empirical and scientific experience. By empirical experience we mean that acquaintance with teaching which is picked up by the teacher in a naïve way. By scientific experience we mean that experience which is secured in actual teaching when the teacher is armed with the principles and the theories of teaching which enable him to interpret what is taking place, and to react to it according to the fundamental ways of acting which his principles provide for him. We cannot, therefore, make the broad assertion that practical experience is the most important aid to the teacher. Empirical experience may be a positive detriment to him, as any teacher in a normal school or teachers' college can testify. But such is not the case with scientific experience. Its assistance is powerful; it throws light upon the teacher's psychological principles, and gives content and meaning to his theories of teaching.

CHAPTER VIII.

MOTIVES.

Section 1. Psychology of Motives.

Definition of Motive.—A motive is generically something which moves one. It may be considered as a motor which drives, forces, pushes, impels, and incites the individual.

Education's greatest problem is that of securing motives for the study of daily assignments. How to secure motives for drill, for the study of arithmetic, of grammar, history, and geography are among its most important problems.

The Source of Supply.—The source of the power that will drive the pupil on to growth and higher development, to satisfaction and control, is within himself. It is primarily and finally his own activity. With this activity, mental, moral, social, physical, or æsthetic, he is endowed by heredity. This is his total supply, sometimes abundant and over-abundant, sometimes meagre and inadequate. Various terms characterize the forms in which this energy is found. Experience is spoken of as being *active*. *Impulse* is a generic term. *Desire* is sometimes used. *Instincts* are said to impel. *Spontaneity,* at least, is attributed to attention.

The teacher's problem is then only that of converting this energy into a form in which it can be used to drive

the processes of school instruction. That there is energy within the child sufficient to attack a reasonable course of study is never questioned. One glimpse at the pupil outside of school assures us of the superabundant energy within him; but how to turn that energy upon school work is one of the most tantalizing problems of pedagogy.

Focal Points.—What we need to find, then, are the conditions under which the activity and energy of the pupil will become focused upon any point. When this is discovered the business of the teacher becomes that of providing or taking advantage of these conditions in such a way as to connect the pupil's activity with the particular units of subject-matter under consideration at any time.

Attention.—One form in which we find the energy of the organism focused is attention. The situation in which we pay attention to an object is one in which habit, as characterizing our old ways of acting, is not capable of giving us control of the situation. For instance, we attend to the mechanism of a watch when it does not tell time accurately. We turn our attention upon our fountain pen when it ceases to give us control of the writing process. We turn our attention upon the milk supply when typhoid or other forms of illness or danger become a menace to health. We begin to study the currency question when a panic has arisen with which the already-formed business processes cannot cope successfully.

Consciousness.—Similar to the foregoing is the condition under which we become *conscious* of objects. So long as the control of the situation is secured by physiological processes consciousness does not enter upon its control. We become conscious of our heart when it ceases to per-

form its work efficiently. As we walk to our place of business we are unconscious of a thousand-and-one objects by the way. But when we find ourselves in a situation in which we are confronted by some obstacle to our progress toward our destination, as for instance by an unusually wide puddle of water in the street, we immediately become conscious of the obstacle. At that moment habit has ceased to be sufficient for control.

Value and Control.—The same conditions are found when we consider our efforts to get control of values. Wherever we fail to have or cease to have control of anything which we consider to be worth while, we immediately institute proceedings to get the desired control. As soon as there is a conscious failure in our methods of control we seek new methods. Suppose, for instance, I am very anxious to catch a train for the city. Control may be lacking on account of a variety of reasons. The time of departure of the train may not be known, the distance to go to the depot may be great, or there is a traveling case to be packed. Immediately energy is turned upon the railway folder, upon the securing of a cab, or upon the selection of suitable traveling appurtenances. If the time of departure were known, if time to get to the depot were ample, or if no baggage were needed, then it would be hard to turn energy upon the objects so enthusiastically attended to in the former case.

It is evident that in all these cases what is needed to focalize the energy of the individual upon any object is to have something which is felt to be worth controlling and to have some obstacle in the way of its control. In such cases experience focalizes all its power to devise some way of securing control.

From time immemorial the race has been busy working upon exactly this problem. It has found certain things worth controlling, and has devised methods of control, ways of acting which will give control. These things we have called subject-matter, and some of the best of them have been selected and put into text-books to be taught to children, so that they will not have to learn them all at first hand for themselves as the race has done.

Hence it follows that if we wish to secure motives for the study of subject-matter, that is, if we wish to turn the energy of the pupils upon subject-matter, it is necessary that we know, *first,* what are the things considered of value to the pupils; *second,* how to create or find situations in which they are conscious of not having the desired control of these values; and *third,* the subject-matter which is designed to give this control.

The kind of knowledge of subject-matter which is best for this purpose has already been discussed. The earlier statement that the function and structure both need to be known by the teacher is here emphasized. If the teacher does not have his subject-matter so organized that he knows what unit is designed to fit a certain situation over which the pupil has little or no control, he can give the pupil no assistance, and the school to that extent fails in its function. Moreover, if he does not know just how the subject-matter works in securing this control, if he does not know its structure, then he can lead his pupil only as the blind lead the blind.

Section 2. Interests.

Motives should also be considered from the point of view of *interest.* The problem of motive is then stated

thus: How can we get children interested in subject-matter? or, How can we connect subject-matter with the interests of the pupils?

Interest and Motives.—Certain psychologists, as Stout and Titchener, define interest as the feeling side of attention. That is to say, when attention is busy with an object interest is also present. Or, *vice versa,* when we are interested in an object we attend to it. If this definition of interest be accepted it follows that interest is a motive, since the energy of an experience is upon the focal point of attention. McMurry,[1] quoting Zeller and Osterman, holds also that interest is a form of feeling, but associates it, not with attention, but with "pleasure, ease, and needed employment." "It is intrinsic, native to the subject and springs up naturally when the mind is brought face to face with something attractive." He defines it also as a "feeling of value, a sense or estimation of the worth of the knowledge gained." Such a conception, then, makes interest a feeling of value, pleasurably toned. And since a feeling of value is in consciousness always pleasurable in tone, it follows that interest may be defined from this standpoint as being a *feeling of value.* And since the energy of consciousness is continually focused upon the control of values, it follows also from this standpoint that interest, because connected inseparably with value, is a motive.

Dr. Dewey states that interest has three phases, the objective, the subjective, and the active. As active it is dynamic, urgent, impulsive, spontaneous, self-expressive. As objective it is centered upon some object or way of

[1] McMurry, "The Elements of General Method," 1903 edition, pp. 85-87.

acting, but *an* object or *a* way of acting which will further the spontaneous self-expressive activity involved. As subjective it is characterized by a feeling of value. "It is the purely important, individual consciousness of worth" present whenever we have internal realization of value.

If we view interest as a feeling, as all three of the foregoing definitions do, we see that it is a motive, because activities whose value is felt have right of way and carry on their work under the most favorable conditions. If we view it as activity, again we find that it is a motive, because it represents spontaneous, deep, urgent activity. It is dynamic. If we concern ourselves with the object of interest we can understand why under some conditions it excites interest. It represents a call for activity, a way in which the activity may find expression, and in which the related values may be realized.

Kinds of Interest.—*Immediate interest* is a term used to indicate the fact that an object is so closely related to the value to be controlled that it is psychologically identical with it. *Mediate* or *derived interest* indicates the fact that an object is not so closely related to the value to be controlled that it is psychologically identical with it. It exists in consciousness as something separate. And a distinct act of association is necessary before the identity is established. The game of football is of immediate interest when to the player it is identical with the strain and effort, the competition, and the pounding blood which are of so much value to him. It is of interest mediately when it is necessary to connect it in thought with these things of value. When some youth is advised to take exercise for his health he may have no forms of exercise which in his experience are identical with health. In that case he has

no immediate interest in athletics. He may have no interest of any sort in them. But when he connects games with health he has in such a situation mediate interest. Later when he has grown accustomed to this connection the interest may become immediate.

Method of Securing Interest in Objects.—Sometimes it is stated that mere strangeness in an object will excite interest. Again, familiarity is given as a quality which will secure interest for an object. But obviously many objects which are strange will not excite interest, and, on the other hand, familiar objects are often uninteresting. Frequently it is maintained that vivid and moving objects excite interest, especially in children. But a moment's thought will show that they do not invariably excite interest. Nor is any quality of the object as such able to invariably excite interest. To find the method, we have to examine the individual. His activities, problems, needs, and temperament determine in large measure what objects will be interesting. James[1] states that the method of securing interest in an object is the following. "Any object not interesting in itself may become interesting through becoming associated with an object in which an interest already exists." In laying out a program for school studies he says, "From all these emerges a very simple abstract program for the teacher to follow in keeping the attention of the child: Begin with the line of his native instincts, and offer him objects that have some immediate connection with these." "Next, step by step, connect with these first objects and experiences the later objects and ideas which you wish to instill. Associate the new with the old in some natural and telling way, so that

[1] "Talks to Teachers," p. 94.

the interest, being shed from point to point, finally suffuses the entire system of objects of thought."

All psychologists agree in principle with this statement. To make any object interesting it is only necessary to establish some connection between it and some other object or some event already interesting in experience. But unfortunately for teachers, the method by which this connection is to be made is not so clearly formulated. James dismisses it by saying, "Associate the new with the old in some natural and telling way." Dr. Dewey goes further and says, "In reality the principle of making things interesting means that subjects shall be selected in relation to the child's present experience, powers, and needs; and that (in case he does not appreciate this relevancy) the teacher shall present the new material in such a way as to enable the child to appreciate its bearings, its relationships, its necessity for him."[1] In the latter case the connection is not to be made between objects primarily. The object is to be connected with the "present experience, powers, and needs of the children" in such a way as to reveal "its necessity for them."

Interest and Control.—The conception that the energy of the individual focalizes whenever there is a failure to control values is of use in throwing further light upon methods of securing interest. For, since anything of value is interesting, it is worth while, and it is a potential expression of the self. If then there is a failure in the process of realizing this value, *any* object or method of procedure which will help to overcome the difficulty and provide control will be of value and interest. Even repulsive things become interesting when we need them in

[1] "Interest as Related to Will," p. 17.

order to secure things of value. A volume of statistics is of absorbing interest when it is the means by which I may establish my claim to something I consider of value. A football rule book may be intensely interesting, hard words and all, to a ten-year-old who may despise a school reader. Arithmetic is worth while to the newsboy who has to make change. Washing the dishes for a month may be viewed with interest if it is the only way in which a boy may earn money to go to the circus.

Hence, to repeat, in order to make any unit of subject-matter interesting it is necessary to find something which the pupil feels to be of value, put him in a situation where he feels that he has not the desired control of this value, and then present the subject-matter as a means for securing control.

This means that the teacher must know the function of the subject-matter and its structure, and must be able to find or create in the pupils the situation for control of which the subject-matter was evolved. Whether the teacher should watch the child to find the situations where control is lacking and then select the appropriate subject-matter, or whether he shall first select the subject-matter and then create the situation in which the pupil feels his lack of control, does not matter so long as there can be established a close connection between the subject-matter to be taught and the situation to be controlled.

Section 3. Needs.

Another form in which motives appear is that of needs. The problem of securing motives may then be stated as follows: How may a sense of need for the subject-matter be aroused in the pupils? or, How may the subject-matter

be connected with the conscious needs of the pupils? This conception provides another and valuable method of turning the energy of the pupils upon any work in hand. Its importance for the teacher will be evident as soon as an analysis of the idea is made.

Definition of Need.—Need is defined as the lack of something that is necessary or important. The essential elements in the definition are *lack* and something of *importance.* The individual who needs bread lacks bread, is without bread, and it is presupposed that bread is of importance to him for some purpose or other. Need and want both indicate lack, but want does not necessarily imply that the thing is of importance to the individual. For instance, when a boy approaches his father saying, "I *want* a dollar," the father may reply by saying, "Do you *need* it?" In making this reply the father is endeavoring to get data from the son by which to decide upon the importance of the case.

The meaning of the term is made clearer if we return to the idea of the control of values. We have seen in our former discussion that a focal point in experience arises when we are placed in a situation which cannot be controlled by our present ways of acting. When health is suffering because all present plans are not sufficient for the task of keeping health then we bring all our powers to bear upon the making of *some* plan that will provide health. In such a situation need is felt *when the insufficiency, the disability, is present in the focus of attention.* When attention is contemplating or feeling the *breakdown,* the *inadequacy* of the powers to cope with the situation, we speak of need being felt.

Need and Interest.—In a situation where there is inability to control, the following phases are present. There is some value to be controlled, there is inability to control, there is an attempt to get control. Now, when attention is concerned with the deficiencies of the situation, need is felt; but when attention swings over to the new method of getting control and identifies it with the value to be controlled, interest is present. Need and interest are not separate and discrete things. They are simply aspects. For instance, if we are working for control then there is lack of control present. If we desire to make things better, we imply that they are not good enough. But in doing so we may focus attention at one time on the lack side, at another time upon the problem of means of control. We are privileged to pay attention to whichever side of the process will be of most service in giving control, and we may do so at any time we wish. At one time we will be benefitted by considering what is wrong, at another how to correct it. But both are going on at the same time. Both are implicitly present, though only the one may be present explicitly.

Characteristics of Need.—As feeling, need is disagreeable, while interest is agreeable. For while interest identifies the object or way of acting with the values which it is to control, need views the present condition as separate from the values whose control is desired. Need is the feeling that comes from the consciousness of poor adjustment or inadequate control, and this is disagreeably toned.[1] Interest, as identifying the present situation with the value whose control is approaching nearer and nearer, is agreeably toned. As cognitive need contemplates the defects in

[1] Angell, "Psychology," p. 264.

the control of the valued object. It is concerned with the means at hand in relation to the desired control, but in such a view it considers the void that is present because of the lack of elements to control. Under some conditions this deficiency is not clearly defined and there is no definite knowledge of *what* is lacking, as when the child cries from sheer discomfort without knowing what is wrong. Under other conditions the inadequacy may be clearly defined, as when the father knows quite definitely that he needs bread for his children. The father in this case is interested in bread when he is concerned with it as the means of supplying growth and strength to his children. He feels a need for bread when he considers the condition of starvation to which they may be subjected.

Dynamically, need is active. For inactivity means degeneration, and in some cases extinction. The more pressing the need, the more forcibly does the individual gather from all quarters energies dormant or active in order to get out of the difficulty. Indeed, there is no other motive so active as need, provided the conditions are not so crushing as to cause despair.

This latter statement leads to the pedagogical principle that when a teacher points out to the pupils weaknesses in their ability to control, he must at the same time supply methods of correcting or overcoming them. Criticism must always be constructive. Mere fault-finding defeats its own end. But finding faults needing remedy and providing conditions for their remedy is wholesome.

Values of the Conception of Need in Education.— A sense of need sometimes works where other means fail. The access of interest taken in educational matters by the Germans subsequent to the Napoleonic wars is directly

traceable to the fact that they realized so keenly their weakness at that time. Never are currency problems so keenly discussed as after a panic. Safe theatre regulations had long been urged in Chicago, but only when the Iroquois disaster came were they provided for by the municipality. A business man may never become interested in healthful exercise till he becomes conscious of failing health. A boy may never care about writing until he finds that somebody has failed to understand him. A great fire causes a sudden influx of business into fire insurance companies. These, and a thousand other examples, will illustrate the fact that until a need is felt, until attention is riveted upon inadequacies, interest may not be taken in means of improvement.

Need is a strong motive because its data are present and not in the future. That is to say, when need is to be aroused, the facts are in hand. The Germans in 1806 saw that at that time they were in a sad condition. They had no army, no navy, no money, no credit. Before that time they were working toward the future, trusting that they would get control, would grow, that everything would turn out well. The boy who writes poorly has some distant day in view by which time he optimistically thinks that in all probability he will be a good writer. But when he sees *now, to-day,* that he cannot convey his cherished meaning clearly and easily there is no chance to dodge the issue. The facts are before him. He realizes that he must learn now.

The need is concerned with keeping control up to a level. Interest is concerned with raising it above the level. Interest may fail because the individual says, "I am getting along well enough." Need spurs such an one on

because he sees that he is *not* getting on as well as he should. And in general, the individual puts forth more energy to save a cherished thing than to add a thing which, perhaps, because of lack of familiarity therewith, he has not yet learned to cherish. Need conserves values. Interest adds values. Yet in the conserving, control of values grows, and in the additive process the values are conserved.[1]

Section 4. Problems.

Another form in which motive sometimes appears is the problem. In such a case the problem of securing motives for study may be stated as follows. How may the children be led to raise the problems which subject-matter solves? or, How may subject-matter be connected with the problems of the pupils?

Relation of Problem to Interest, Need, and Control of Values.—The problem is the cognitive phase of these. This will be clear after a few statements of relation. When there is a break-down in control the problem of how to get control arises. When there is a need present the problem becomes one of satisfying the need. When interest is fulfilling itself the problem is that of securing ways to fulfill it. For instance, a student goes to a new town and finds that he has no friends. Having friends

[1] In this section stress has been laid upon the conception of need, not because it is a conception that ought to supersede the conception of interest, which would be psychologically impossible, but because the agreeable feeling tone of interest has been overemphasized in educational theory, and the elements that come from a conception of need have not been given their proper place in theory and have been carried on *sub rosa* in educational practice. What is needed is that this conception, carried out in school practice because in practice we get nearer the truth than in theory, should be given a place in theory, and by being so recognized be better regulated.

may be a value, to have friends may be a need, or he may be interested in friends or in having friends according as we express one or another of the phases of the question. In every case, however, the problem of how to get friends arises. And in securing this valued friendship, in satisfying his need for friends, or in fulfilling his interest in friends in so far as he thinks, perceives, organizes plans and tests them, he is concerned with the cognitive side of the situation. When he has solved his problem he has at the same time controlled his value, satisfied his need, and fulfilled his interest. And this is so because the problem-solution idea is simply the cognitive phase of the process.

Method of Raising Problems.—The method of raising problems is the same in general as the method of arousing need or interest. If the pupil can be put into a situation where he has to control some value over which he has not control, the problem of controlling it will arise. The *first* requisite is the presence of some object or activity, whose possession is considered worth while. The *second* is the recognition of inability to control it. When these are present the problem arises naturally and of its own accord.

Conclusion.—With the addition of the term "problem" there are four concepts with which motive may be connected. Energy is focalized when there is some value to control, some need to be satisfied, some interest to be fulfilled, or some problem to be solved.

It becomes evident, now, why the function of subject-matter has been described as it was above. The race is busy working out the methods of controlling values, satisfying needs, fulfilling interests, and solving problems. These methods are preserved as long as they are useful and

sometimes longer. Some of the best and most important of them are collected and put into the school course of instruction. The function of subject-matter is to solve the problems, satisfy the needs, control the values, and fulfill the interests of pupils.

CHAPTER IX.

MOTIVE APPLIED TO EDUCATION.

Section 1. Active and Potential Motives.

By the term *active motive* we mean the needs, interests, and problems *actively* present which call for subject-matter by which to satisfy and solve them. The term *potential motives* characterizes the fact that the pupils *have the capacity* to appreciate problems, needs, and interests as soon as conditions have been provided for arousing them.

The necessity for this classification of motives arises from two conditions, one practical and the other theoretical. Considering the practical side, in the course of a day's work the teacher finds two sets of conditions. In one case the pupils ask him questions; this indicates active motives. In the other case the teacher has subject-matter which is to be taught, and for which he has to arouse the need or raise the problem for whose solution the subject-matter was created. In this case he presupposes a potential motive; the teacher's problem becomes that of making it active. In the former case there is no problem of providing a motive, the active motive being already present. In the latter case, the problem of arousing a motive is all-important, since an active motive must be provided before the lesson can be learned.

On the theoretical side the distinction is of importance.

There are some authorities who in theory claim that the business of the teacher is to follow the active motives of the child and, as these motives become evident, to provide the subject-matter relevant to them. In this case the subject-matter of the course must be fluent and must vary for different pupils. On the other hand, there are those who claim in theory that the important thing in the school is the course of study, representing as it does the solutions of problems which are necessary for the child when he enters life, and that the motives of the child are chiefly those of the will. But midway between these two positions stand the great majority of educators who claim rightfully that there are undoubtedly many things important for the child to acquire and that these should be gathered up in a course of study, but that the order of teaching them should be so arranged that each will be taught at the time when the child has potentially within him, the motive for studying that particular thing.[1] It is not a matter of making the subject-matter wait upon his active motives, nor one of ignoring any worthy motive whatever. It is a question of finding out what problem, need, or value each unit of subject-matter was created to supply, and of introducing it at a time when the relevant need or problem is potentially present in the child's experience. The teacher's first business in this case would of course be to transform this potential motive into active form. In this way the course of study would not need to wait upon each pupil. It could be arranged according to broad stages of child development, and hence could have sufficient stability for practical purposes in any school room.

In the case of the active form, the motive is ready at

[1] Dewey, "The Child and the Curriculum."

hand and there is no problem for the teacher except, perhaps, that of deciding whether the motive should be utilized or ignored. In the case of the potential form the problem of arousing a motive is a serious one, and of this the present chapter will treat.

Section 2. Subject-Matter of Immediate Interest.

Statement of Aim.—When reliance is placed upon immediate interest all the teacher needs to do in beginning the lesson proper is to get the problem before the pupils by a statement of what it is to be. The motive is supposed to arise spontaneously, for the subject-matter is immediately made identical with some value which the child cherishes.

McMurry[1] expresses in brief form the characteristics of such a statement. First, it should be *concrete*. For instance, he advocates the advisability of stating the problem thus: "How does Chicago get its water?" rather than, "How do cities get their water?" Again, in teaching the fable of the Lion and the Mouse, the teacher may properly aim to show to her pupils that little things may be of much help; but her concrete statement might be, "Let us hear a story about how a mouse once saved the life of a lion." A second requirement is *definiteness*. Announcing that to-day's lesson is a continuation of yesterday's is indefinite. Nor is the statement of the aim "about Spain" as good as, "Why are nearly all the large cities of Spain on the coast?" A third requirement is that the statement be *short, simple, and attractive*. Strange words should not be used. For instance, rather than *metamorphoses* use

[1] "The Method of the Recitation," 1903 edition, pp. 107-111.

changes; rather than to say, "What is the function of leaves?" say, "How do leaves help the trees?"

Again, in physics, instead of stating the problem of gravitation as, "What is the nature of the attraction between bodies?" it is preferable to ask the historic question, "Why does an apple fall to the ground?" Or if square root is to be studied, instead of asking an abstract question, make the situation concrete by asking, "If you had a square field containing 185 square rods, how long would each side be?" Other examples of such concrete statement are given elsewhere.

Attractiveness comes from various causes, one of which is the dramatic introduction of new views of old subjects. For instance, in teaching the siphon inquire, "Under what conditions does water run up hill?" Instead of saying, "To-day we will take up the cause of wind," ask the question, "What makes the wind blow?" To have the ability to startle children in their complaisant acceptance of ideas is one of the best ways of making subject-matter attractive. In physics, "Why is it that sometimes when water boils it will not boil eggs?" may well introduce the relation of pressure to the boiling point. Again, "Why is it harder on a horse to trot down hill than up hill?" will introduce the principles of momentum. The teacher with an instinct for startling contrasts is able to do much in making subject-matter of immediate interest to students.

Aim and Problem.—In the statement of the aim two relations need to be borne in mind. In the first place, the statement of the aim is the statement of the problem to be solved. In the second place, the aim to be stated is the *conscious* aim of the pupil.[1] The teacher may have in

[1] See Chapter I.

addition other aims of which the child is not conscious, but these have no place in any consideration of the pupil's aim.

Extent of Reliance to be Placed Upon Immediate Interest.—Any experienced teacher knows that complete reliance cannot be placed upon immediate interest, nor can he always depend upon the mere statement of the aim to secure interest, even when expressed in short, concrete, simple, and definite form. The element of attractiveness covers all cases not covered by the others. An attractive problem (or aim) will always interest. But in the securing of attractiveness we have to rely frequently, though not always, upon mediate interest. This will be discussed in the next section.

To what extent can we rely upon immediate interest? In answer to this query no general concrete rule can be laid down. When we come to specify what characteristics of the object will be interesting we have to decide, as in Chapter 8, that there are none which invariably are so, for the question of interest goes back to the individual. Those objects are interesting which give him control of values.

Specifically we may say that whenever we take up the logical or formal study of any subject we have to presuppose immediate interest in the subject. When history is studied as history we have to presuppose that the problems of history are of interest *per se*. When English history is studied, even as an aid to understanding American institutions, we still have, in the main, to presuppose immediate interest in English history from day to day.

When we study any subject incidentally we do not have

to presuppose interest in it *per se,* but we do have to presuppose immediate interest in the thing because of which it is studied. For instance, when we study arithmetic in manual training we have to presuppose immediate interest in the work which the arithmetic is intended to help.

About the only rule that is formulated for practical guidance is this: *Rely upon immediate interest in subject-matter when it is as interesting per se as any other value to which it may be related.* For, as we have seen in Chapter 8, any subject can be made interesting if it can be related to some other thing of value that cannot be controlled without its help. But if a subject cannot be made to help in the control of any other thing of more value than itself, there is no good reason for the extra connection, so far as motive is concerned.

Caution.—The function of each unit of subject-matter is to get control of something of value. Each unit of subject-matter has a specific function for which it was created and for which it has been retained. Some of this subject-matter is preserved as an end in itself, and some as purely instrumental. It therefore becomes necessary for the teacher who relies upon immediate interest, chiefly curiosity, to be sure that before the unit is left it is used in the situation for which it was constructed. For instance, if curiosity is relied upon to engender interest in the agreement of noun and verb, the subject must not be left until the pupil has used this rule in situations for which it was made. He must be made to apply it in the communication of ideas in his own speech.

As an instance of what should not be done, the following is germane. In a school system where the rules of spelling

in accordance with the text-book are taught in the fifth grade, a seventh grade teacher said, "I think it is a mistake not to have those rules taught in the higher grades." From her tone it was to be inferred that they were not to be used in the seventh grade because they were taught in the fifth grade. This is the danger of reliance upon curiosity to create all the interest necessary. The instrumental subject-matter is not viewed as a tool to be used for the control of certain types of situations. When immediate interest is relied upon these instrumental uses must be taken care of in the application. Otherwise, the child gathers mere rubbish, interesting rubbish to be sure, but still rubbish which is to be thrown away at some time just as the broken china, the lucky stones, and the mutilated stamps, which are at one time so attractive, are later outgrown and discarded. It has in its day served a purpose in development, but if its instrumental purpose had only been revealed it might remain throughout life as a serviceable part of experience.

Section 3. Subject-Matter as Mediately Interesting.

When the active motive is not present and when the potential motive cannot be immediately aroused by the statement of the aim by the teacher, it becomes necessary to fall back upon mediate interest in order to find a motive.

To accomplish this it is necessary to create a situation in which the pupil is unable to control some value without recourse to the subject-matter. The elements are three,—some value to be controlled, inability to control, introduction of the subject-matter.

Generic and Specific Values.—By *generic values is*

meant values which are in evidence in many fields. The virtues,—honesty, desire for good standing, love of approbation, self-reliance, duty, thoroughness, neatness, obedience, and freedom are examples of these values. They are generic in the sense that they apply equally well over a large area. For instance, honesty appeals equally well in arithmetic or drawing. By *specific* values is meant those particular things which are of value only over a limited area. For instance, building a box, playing football, developing pictures, the story of George Washington, writing a poem, are specific values because they do not have wide occurrence. They are particular, *sui genera,* not common to a class of situations.

Classes of Generic Values.—Some of these are permanent and universal, such as honor, thoroughness, pride, obedience, self-reliance. Others are peculiar to the schoolroom, such as grades, promotion, exemptions, not being kept in, etc.

Generic Values and Motives.—One method of securing a motive for school work is to create a situation in which the pupil will see that he must acquire the subject-matter in order to control these generic values. For instance, he desires a good grade. He will not get the good grade unless he learns the lesson. He likes to get out after school with the rest of the boys. He cannot unless he studies his lesson. He wishes to be self-reliant. He cannot be if he does not study his lesson without assistance. He craves the good opinion of the teacher. This is not to be attained if he does not study. He wishes to be thorough. This he will not be if he does not get hold of the details of subject-matter. He prides himself on his

honesty. He will not be honest unless he acts in such and such ways.

It is evident that these are common methods of securing a motive for endeavor. Moreover, it must be acknowledged that the permanent and universal values are the ones to be developed and utilized. They keep many a ship from going on the rocks. It must be admitted that every teacher is compelled to rely upon these at various times when other motives fail.

Chief among them is the generic value called obedience. The average pupil needs to feel that it is valuable to do a thing simply because it is demanded of him. If he does not feel this element of necessity in the atmosphere of the schoolroom, the tone of his work will be lowered. Very few teachers can rely wholly upon the pure interest of the child in his work, for the interest of children in any topic is relatively short-lived. And it may often die out before a reasonable degree of proficiency has been secured. In the attainment of skill there must be usually a good deal of uninteresting drill, and if the pupil is not held to it by an appeal to some generic value such as this he will often fail. Moreover, this respect for authority is a salubrious element in his life outside the school as well as in, and therefore cannot be neglected. *The schoolroom which is not vertebrated by firmness and spiritual compulsion cannot accomplish the best results in training.*

But while generic values have their place, they are sometimes used to an extreme degree. Only in so far as they form the reserve of the schoolroom, the atmosphere of endeavor or the background of the scene, are they rightfully used. They are not wisely used when they form the sole

incentive to work. This is especially true for the reason that the specific function of subject-matter as an instrument of experience has no particular place in their economy.

Specific Values and Motives.—One other case remains to be described. When appeal is made to specific values the instructor first determines the function of the subject-matter. This gives him the cue for searching out the situation in which to place the child. For the latter is to be made conscious of the lack of control to remedy which the subject-matter was constructed. For instance, since the function of punctuating is to show relation between thoughts for the sake of definiteness in communication, the teacher will try to put the boy into a situation where he sees that he has made an error in writing something, though his knowledge of it is correct. Then he has a motive for studying punctuation. Or, again, since the function of the subject-matter on the Commonwealth is to show how the English of that period failed in self-government when given a chance, the instructor will lead the children up in their history to the place where the English people had, by removing the king, taken a step in the solution of their problem of attaining self-government, and will then lead the way to the new subject-matter by interrogation, "When they now had a chance how did they succeed?"

Further illustrations of this method of introduction will be given in the next chapter. The method of its manipulation is, *first,* to determine the function of the unit of subject-matter to be taught; *second,* to arouse the need for whose satisfaction it was created. This is done by putting the child in a situation in which he sees that he lacks control of some value, and that he must turn to this sub-

ject-matter in order to secure control. The efficiency of the method depends upon the ability of the teacher to create the specific situation for whose control the subject-matter was constructed. If the intrinsic function is not brought into touch with the specific need relevant thereto the method fails.

Practical and Imagined Situations.—It is evident that the situations into which the pupils are put may be practical or imaginary. For instance, in the case of learning the facts of addition, the children may be playing a game, each child putting down his own score. At the end of three rounds the teacher may say, "Who is ahead?" Here is a strong and practical motive for addition. Again, in dealing with the facts of notes, and checks, and drafts, etc., the pupils may not have a chance to do real banking, but may construct a make-believe bank, with very little of the bank association, to run which successfully the facts mentioned have to be learned.

There is no question as to which is the more valuable of the two. From every point of view the practical situation produces the stronger motive. And this fact it is which lends so much fascination to the organization of the instrumental subjects, as grammar, arithmetic, and spelling, on the incidental plan. A practical situation is created in which the children have *real* needs for the material presented.

However, so long as we have a rigid division between subjects these situations so created must in many cases be artificial and the teacher should frankly abandon the method in such cases. But even as the course is now organized there are innumerable instances in which it works to the great improvement of motivation.

CHAPTER X.

EXAMPLES OF METHODS OF SECURING MOTIVES.

Section 1. Composition.

The function of language has been stated above as that of using words to convey values to others interested in them but possessing a different level of control. It is necessary for the most enthusiastic language work that the speaker or writer have something that he thinks of value, that those to whom he wishes to tell it be interested in this thing, but that they do not know as much about it as he does. The forms of language are the tools which the race has worked out to give control of this transference of value.

Individual Subjects for Composition.—Let us examine into the methods by which a situation may be created that will provide language motives. In order that the writer may have some value to express, of which the audience does not have control, the subjects of compositions may be chosen by the writer. If all write upon the same theme it follows, on the one hand, that the teacher cannot be sure that it is of value to the writers, and, on the other hand, one incentive to writing is taken away, because everybody knows as much about the topic as does the writer. Whether or not the topic be chosen by the writer, it must be a valuable one to him. In order to secure this, one rule may be laid down: let the writers

choose a superlative experience—the *funniest,* the *most thrilling,* the *saddest,* or the *most peculiar.* The writer must also think of his audience, and select among his valuable experiences those which he believes will interest them.

A Genuine Audience.—In order to get an audience that will be below him in a knowledge of the thing he is to convey, the whole class should be the audience. He may feel that he cannot tell the teacher anything, but he is surer of the class. In addition to this the teacher should cultivate the attitude that makes the pupils feel that they *can* give him things which he does not already know. For undoubtedly they are often in a position to do so in connection with some matter of peculiar interest to them.

In such a situation it is only necessary to get the writer to feel that he cannot convey his meaning efficiently. In getting him to realize this and thereby feel the need for the forms of language, the audience, including the teacher, assists. It can decide upon his effectiveness as readers decide upon the effectiveness of a novelist. If they make him aware of the fact that he has not given them something worth while, he will be conscious that he has not accomplished his purpose.

With the need thus aroused the teacher sets to work with the class to devise a scheme for getting control of the process of communication. In almost every case the teacher can, by a "common sense method," get the children to state how to do it. And when they have found it they have struck upon the form or principle of language which the race has already worked out.

Report of a Series of Lessons.—The following is an example of how certain language forms used in descrip-

tion were taught: These forms were the fundamental image, point of view, details, choice of words, figures of speech, character description, and impressiveness.[1]

Description.—The class had been working upon narration and had found that whenever their narratives required descriptions the results were very unsatisfactory. So, with the weakness thus made evident, and their main problem—that of becoming efficient in writing descriptions—being clearly in mind, they turned to a study of description.

The first thing the teacher did was to have the class describe a thing without any directions except that they were to choose some one of six buildings on the campus, with the understanding that they were to make the picture clear enough for the others to see the thing described. These themes were read in class. The students criticised them on the basis of clearness of pictures. The audience felt that they could not get a clear image of some buildings, while they could of others, but that they did not see why this was so, except that the good themes seemed to follow some plan of description, and bad ones did not.

The General Outline.—The problem then became that of discovering what made certain themes good. The teacher helped in this by exposing a picture to them several times in order to show them how things are really seen. At the first exposure they got only an idea of the general outline, and at each succeeding exposure they were able to add details. In this way the students were able to formulate the statement that in description one should

[1] Taught by Carter Alexander in Teachers' College High School, University of Missouri.

give a general idea to the audience first. They had thus arrived at the fundamental image. Then they went to Hawthorne to see how he handled the fundamental image. They next were asked to write themes in which they paid particular attention to this principle. These themes were read in class.

The Point of View.—The audience found that in describing a scene they had mentioned things that could not be seen from one standpoint; e. g., describing the outside and inside of a church in the same picture. Again they went to Hawthorne to see what he did with the standpoint, and found that he described from one point of view, or if he described from more than one he made the reader aware of the change. Then they wrote themes emphasizing the point of view and fundamental image.

Details.—During all the writing of descriptions the students had been worried about details, saying that they became confused about what to put in and what to leave out, and particularly in what order to place the items. This created a demand for a lesson on details. They discussed the matter themselves, and later consulted Hawthorne. Then other themes were written and read in class.

When these were read the audience brought out the fact that while some themes had a good point of view and handled details well, the impression was still flat and uninteresting.

Effectiveness.—The teacher then called up instances in which the students had used effective descriptive words and phrases, and said that they would study two methods of creating effectiveness, words and comparisons. There-

upon they went to Hawthorne again to see how he used these effectively. Again themes were written and read in class. The teacher once again set the problem, this time the study of comparison from a little different point of view, viz., figures of speech. Again they went to Hawthorne, and in addition studied some faulty figures in order by contrast to bring out the point that figures of speech should be used only when they made description more effective, and that if a figure of speech attracted attention to itself it did not enhance the whole description. Then once more they wrote themes, and again read them in class.

Describing Persons.—Previously the students in writing themes had become conscious of their inability to describe people as well as scenes. The teacher referred to this and directed attention to description of people. They consulted Hawthorne to see his method and wrote themes in which they described teachers or pupils in the school but not in the class. They did this in order that the audience might have a chance to decide upon the truthfulness of the description. This proved intensely interesting.

Specific Impression.—In this lesson the audience observed that while some descriptions were impressive in parts, many of them did not have a central impression which they wished to convey. They then went to Hawthorne and to George Eliot to see if they had such, and how they seemed to secure it. They thereupon wrote themes in which they endeavored to convey specific impressions, such as the grandeur of Academic Hall, the disorder of a room, fear at night, pity, etc.

Conclusion.—This was all the time that the students were able to devote to description. They returned to the original narratives upon which they had failed, and rewrote them to make them more effective.

The teacher believes that in going over this course another time he would introduce the specific impression earlier, as a means of controlling details in the image, and as a means toward making the theme less flat and uninteresting.

This series of lessons seems to be particularly valuable as showing a method of so handling a course that the class itself will feel that their work is not satisfactory, that they will then take hold of the problem of making it more satisfactory, and that they will thereby feel the force and see the pertinence of the principles of composition.

Section 2. Reading.

Oral reading has a function similar to that of language, but differing in that the reader transmits to his audience the thing that he thinks valuable *expressed in the language of someone else.* But before he can read effectively he must make the value his own, and consequently in oral reading the situation is the same as in language.

The Motive in Oral Reading.—To build up the motive for reading the reader must feel that he has something worth reading with which his audience is unacquainted. Reading is likely to lack motive if everybody reads from the same book, and if each reader knows that everyone else knows as much about it as he does, probably more if he reads poorly. To obviate this, and to give a motive for reading, three devices may be mentioned: *First,*

the pupils may be allowed regularly to bring to class clippings, jokes, short stories, sidelights on other lessons, etc., and read these. *Second,* the class may regularly be divided into two sections, and each section be allowed to have a different text-book. Then as each section reads, the other section constitutes an audience. *Third,* pupils in the study of other subjects, when exact information upon points of dispute or methods of procedure is lacking, may be allowed to turn to their books to find and read the sentences that will give the desired information.

How the Audience Helps.—To introduce the forms of good reading, such as enunciation, pronunciation, and carrying quality of the voice, it is only necessary to make the reader aware of his deficiencies by appealing to the audience. For instance, the other section of the class may report that they cannot hear the reader. Then he has a motive for learning to speak distinctly because he *wants* the audience to hear the fine story he is reading. Rules for speaking distinctly will be forthcoming from the teacher and the class.

Silent Reading.—In silent reading, where the pupil is reading to get the idea rather than to convey it to others, conditions are reversed. Here the author has the thing of value, and the reader does not have it but is interested in it. Motives for studying the forms of silent reading easily follow from analogy with the foregoing.

Section 3. Writing.

The Function of Writing.—Writing is an offshoot of language. It has the same general function—to communicate things of value to others who do not have them.

Its specific function is to attend to the form of letters. Evidently the forms of letters should be drilled upon when the pupil sees that he cannot make his meaning clear because his writing is illegible. Legibility is the final standard. If he sees that something he wishes to say is misunderstood, or is understood with difficulty because he writes illegibly, he will have a motive for studying the writing forms.

A Motive for Practice.—The following device, which may be used from the sixth grade up, makes the writer conscious of his deficiencies and anxious to remedy them. Suppose we go on the assumption that a child whose writing is reasonably legible does not need to have special writing lessons. This is a fair assumption. Then make the writing period one in which *only* those who write their *composition, arithmetic, geography,* or *history* work illegibly shall receive special instruction, and as soon as the writing in these subjects becomes legible they will be excused from the writing class. This has several advantages. It raises the general tone of writing. It makes those who write illegibly feel a need for writing legibly. Moreover, it provides that since only a few of the pupils, and these the poor writers, are in the class, the teacher can spend his time to better advantage in teaching them.

Section 4. Arithmetic.

Incidental Work.—If arithmetic is taught incidentally it is an easy matter to secure motives for its study. For instance, in the game of "bean bag" in the primary grades, where the pupils try to throw four bags, say, through a hoop, a motive for addition may be secured.

Each of the children may be allowed to put down in a separate column on the board the number of bags he throws through the hoop, thus giving practice in counting and making figures. After going three times around the class the following table might result:

Mary	Willie	John	Susie	Tom
3	4	2	3	1
2	3	1	4	3
3	3	3	2	4

Then the question may be asked, "Who is ahead?" Here is a strong motive for adding, for this question cannot be settled till the results are added.

Or, again, in the construction of a flower bed all sorts of arithmetic facts will be necessary before the bed is laid off, and each pupil given his proper share. Here also the motive is strong, and the study of the necessary arithmetic will be carried on with vigor.

Isolated Arithmetic.—But when arithmetic is taught as a separate study, and situations have to be found which will require the use of its principles in order to get control of the situations for which the race has constructed them, it is sometimes impossible to find practical situations such as can be found if it is taught incidentally, or such as we have cited in language, writing, and reading. Then the teacher has to fall back upon generic values, upon immediate interest, or upon imaginary situations. However, in all cases in which an appropriate imaginary situation can be devised it should be built up. A few examples may be given.

Carrying in Addition.—Some teachers teach carry-

ing in addition by dramatizing bookkeeping. The children are bookkeepers for the Chicago Flagstaff Company. The staffs for shipping are done up in bundles of ten. Three dealers in Oskaloosa, Iowa, send in orders, one for one bundle and six separate staffs; one for two bundles and four separate ones; and the last for one bundle and five separate ones. They are all to be done up in bundles to be broken in Oskaloosa. How many bundles? The value here is to do the work of the "bookkeepers" and to order the bundling to be done. The carrying must be performed before this can be done.

Business Forms.—Again, by establishing a "bank" in the school and allowing the pupils to carry it on, at first, *without instruction,* it is possible to have them feel the need for written promissory notes, for receipts, or for checks. These will, then, be better understood, because the pupils are conscious of how things are going wrong when they are not used, and will "discover" them as means for keeping correct accounts.

Cancellation.—An example of a very good method of introducing the rules for testing for factors by sight is the following, which illustrates how a *practical* situation may be created when arithmetic is studied as a separate subject. Take, for instance, the rule of divisibility by three. We know that if the sum of the digits is divisible by three the number is divisible by three. The function is to give *rapidity* in cancellation. We may teach this by appealing to immediate interest, and state the aim, "Let us find a quick way of telling when a number is divisible by three." But it is more effective to arouse a need for it. This may be done as follows: The children are supposed to think that rapidity in cancellation is worth while. To

bring this value actively into consciousness give a few exercises, such as $\frac{27}{54}$. $\frac{19}{57}$. $\frac{24}{36}$. working for rapidity. The teacher's next problem is to make the children see that they are not so rapid as they might be; that is, that they have not full control of the value. This may be done in a variety of ways. Perhaps a particularly difficult problem may be given, such as $\frac{729}{2181}$. While the children are laboring with it the teacher may work it out on the board, and then before they have finished may say, "I have already finished; you are slow," etc. And may explain further, "I didn't do it more rapidly because I am a better divider than you are. I have a short way." This will make them conscious of slowness, and will give them a stronger motive for learning the rule than does mere immediate interest.

Section 5. History.

In the study of history the problem of the new unit usually can be made to rise out of the previous units. For if there is a central problem running through the whole period of history, each event is usually an attempt on the part of the nation to solve that problem which, though in reality always the same, presents new phases, because some new factors come in to disturb the conditions already present.

This will be at once evident if we notice the arrangement of the following three lessons. We are to presuppose that the function of the subject-matter upon the Revolutionary period is to show the relation of that period to the growth of the Union. Similarly, the function of each unit within the period must be to contribute to this main

function. It will be observed in the lessons selected that the subject-matter is organized according to three main divisions: (1) The conditions giving rise to the event, which are subdivided into (a) old conditions and (b) new factors, and these, again, into subdivisions for and against union. The new factor raises the problem. (2) The event which results as an attempt to solve the problem. (3) The success of the solution (in terms of the main problem). This division has one advantage over the conventional division—cause, events, result—in that it focalizes the attention upon the problem aspect of history and tends to emphasize the continuous persistence of the problem studied.

LESSON I. ALBANY CONFERENCE, 1754.

A. Conditions giving rise to the conference.

1. Old conditions.

(a) Working against union—in general, local interests.

(1) Religious differences—Catholics, Episcopalians, Puritans, and Baptists viewed each other with intolerance.

(2) Political differences.

i. Town government in the north, county in south, and mixed in middle states.

ii. Different classes of colonies—royal, charter, and proprietary.

(3) Social differences.

i. Holders of large estates in the south, and small farmers in the north.

ii. Cavalier ideals in south, puritan ideals in north.

iii. Wide differences in wealth and social position in south, small differences in north.

iv. In south only industry agriculture, in north industries varied, both in and outside of the home.

v. Lack of transportation facilities tended to emphasize isolation.

(b) Working for union—necessity for defense against the French and Indians, for which purpose conferences were called, coalitions formed from time to time.

2. New factor (giving rise to new form of problem)—serious nature of hostility between the colonies and the French and Indians immediately preceding the French and Indian war, 1754-63.

B. Albany Conference, 1754. This came as a solution to the problem of defense, and was called at the request of the mother country.

1. Franklin's plan—colonies should combine for

(a) Defense against incursions.
(b) Regulation of Indian affairs,
(c) Levying of taxes.

2. Made treaty with the Iroquois.

C. Success of conference.

1. Colonies still afraid of loss of independence, looked with indifference upon proposals to combine (too much royal prerogative).

2. British government indifferent because of danger of thereby revealing to the colonies their own strength (too democratic).

3. Brought the idea of union into the realm of practical politics.

LESSON II. THE SEVEN YEARS' WAR, 1756-63.

A. Conditions giving rise to the war.

1. Old conditions.
   (a) English policy of territorial expansion.
   (b) French policy of territorial expansion.

2. New factor—giving rise to problem.

   Coalition of England with Frederick the Great because of Hanoverian entanglements, and coalition of French with foes of Frederick —war between Frederick and his foes.

B. The Seven Years' war (solution of problem of supremacy—in America).

1. Campaign against Duquesne—giving key to the west.

2. Campaign against Louisburg—giving naval control of the St. Lawrence.

3. Campaign against Quebec—giving control of Canada.

C. Success of the war (in terms of the main problem).

1. Union was facilitated by
   (a) Active feeling of co-operation among colonies,
   (b) Consciousness of military strength.

2. Union was retarded by freedom from invasion.

Lesson III. Stamp Act Congress, 1765.

A. Conditions giving rise to the Stamp Act Congress.

1. Old conditions.

(a) Factors working for separation.

(1) As in Lesson 1.

(2) Freedom from invasion (Lesson 2).

(b) Factors working for union—as mentioned in C. 1 in Lesson 2.

2. New factors—giving rise to problem.

(a) The mother country began to enforce the policy that the colonies exist for the benefit of the mother country.

(1) Enforcement of Navigation Act, which led to

(2) Writs of Assistance, 1761, which were obnoxious because subversive of personal liberty.

(b) Parson's Clause, 1761, an unpopular assertion of the royal prerogative.

(c) Demands on the part of the mother country that the colonies help to defray the expenses of the Seven Years' war.

(1) Difference of opinion—the mother country claimed that the war protected the colonies, while the colonies claimed that the war was a part of the mother country's imperial policy.

(2) Stamp Act—the instrument by which the mother country sought to enforce the demand.

(3) Serious objection by the colonies on the ground that there should not be taxation without representation (riots, formation of patriotic societies, etc.).

B. Stamp Act Congress, 1765 (an attempt to remedy the difficulty).

1. Drew up petitions to the king.
2. Made Declaration of Rights to parliament.

C. Success (in terms of the main problem).

1. Colonies act together again for a common purpose and upon their own initiative.
2. Colonies gained increasing consciousness of power (with repeal of Stamp Act).

SECTION 6. A STUDY OF MAGAZINE ADVERTISEMENTS.

An interesting illustration of the use that advertisers make of these principles may be secured by anyone who will glance through the advertisement section of any popular magazine. The advertisements may be roughly divided into three classes. *First,* those which lay stress upon present *disagreeableness* and present a means for removing it. *Second,* those which state the *advantages* that are to be secured by the use of the method of control advertised. *Third,* those which *merely* state a business proposition, presupposing the presence of a need, and presenting the method of satisfaction without embellishment.

Emphasis Upon the Unpleasant.—As instances of the first method we have such statements as these, illustrated frequently by harrowing pictures: "The day's work. What

does it mean for you? The same old grind?" "$100,000,000 wasted on ads that never pay." "Ring in, ring out, year in, year out. Do you lose your individuality daily with a 'punch' on the time clock?" "Are your eyes normal?" "No three o'clock fatigue." "Death uses the phone. Suppose a consumptive breathed into your open mouth, etc." "Are you deaf, or with ears failing?" "Why stir up the dust demon with frenzy like this?" Then follows methods of curing these disagreeablenesses.

It is interesting to observe that advertisers of wares for which there is not normally a strong demand utilize these forms of approach. For instance, one correspondence school uses it almost exclusively. Medicine advertisers do so notoriously. The fact that the magazine advertisers do not use this method so frequently as the others is accounted for, in part, by the fact that it does not pay to advertise in magazines those articles for which there is not an actual or potential need *easy* to excite.

Emphasis Upon the Pleasant.—To find illustrations of the second method one need glance at the advertisements in only the most cursory way. For instance, "The Young Bride's Ally," reinforced by a charming picture, paves the way for Blank's delicacies. "The Royal Chair—push the button and rest," accompanied by the picture of a rotund gentleman lying in leisurely ease, seeks to awaken in the tired man a desire to buy. "The Strength of Gibraltar" is well known.

The Matter of Fact Statement.—Illustrations of the third are found among want advertisements. They are not common in the advertising section. They are much more

common in the schoolroom. Many teachers feel no necessity for showing the child either the advantages of the method or the disadvantages it obviates. Such children have to take the subject-matter whether they want it or not, and whether they see that it has some use or none.

CHAPTER XI.

REVIEW OF PAST EXPERIENCE.

Section 1. Review for Motive.

The Place of Past Experience.—Without past experience, inherited or acquired, the individual would be absolutely helpless. In certain of the great biological needs it operates as instinct and reflex movements. In all situations similar to those which have been met before it operates as habit. In situations where a new method of control is to be worked out it is the material out of which the new method is evolved. In a more indefinite way it constitutes or modifies temperament, prejudice, and bias.

Necessity for Review.—Since the foregoing is true past experience is always in use, both in school and out. But there are certain occasions during the recitation where it is necessary, or desirable, for the teacher to have an *explicit* review of certain facts and activities that the pupils have previously experienced. This is necessary because even though these data may be stored away somewhere in experience they are not, simply because of that fact, absolutely sure to be recalled. They may be tucked away in some outer zone of attention, and the appropriate association may be lacking to recall them to the focus of attention when they are needed. They need to be recalled, revived in consciousness, by the teacher in class.

Relevant Past Experience.—It might seem unnecessary to state that the past experience reviewed by the teacher should be relevant to the problem under consideration. It is a matter of simple economy of time and intellectual effort to confine the review within those limits. And yet teachers, through neglect or the desire to have some review of past experience because a theory calls for it, often fail to select facts and situations for review which have any logical connection with the problem in hand.

Two illustrations will suffice. A teacher who conceived the function of *Crossing the Bar* to be, "To describe a desire for a peaceful death" (the correctness of this being immaterial, since we are concerned with the relevancy of his review of past experience), gave the following questions in review of the pupils' past experience: "Have any of you ever seen a harbor? Describe it. Show some pictures of a harbor. Describe the tides at the coming in and going out of a ship." This was the whole of the review. To be sure, the terms "harbor" and "tide" are used in the selection and to that extent there is relevancy. But *the* relevant past experience, as determined by its logical connection with the essential features of the poem, would deal with ideas about death, or a review of Tennyson's life, showing how *a propos* of the closing scenes and emotions of his life the poem is. Again, another teacher dealing with this same poem did review Tennyson's life, but in the following manner: "When was Tennyson born? When did he die? What were his chief works? What other of his poems have you read? Do you like his poems?" Good facts, to be sure, but what is their relevancy to this poem any more than to any other of his poems? How do they prepare the way for a better understanding or appreciation

of the problem he was trying to solve? In order to make this review valuable those facts, and those only which show the poem's force and naturalness, should be reviewed.

Review to Secure a Motive.—One reason for a review of past experience is to secure a *motive* for the study of the lesson in hand. Sometimes immediate interest supplies the motive without the necessity for any review. For instance, in the study of poems, the teacher under some circumstances can secure the motive by the mere question, "What is the problem the author is discussing here?" But under other conditions a review of past experience is necessary. For if subject-matter provides the means for the control of values, generic or specific, it frequently happens that the values to be controlled have not been in the focus of the children's attention for some time, and hence may not be appreciated as highly as they might. Then it becomes necessary to bring them in and to create the conscious lack of control.

Illustrations.—For instance, in teaching the rule for divisibility by three for the sake of speed in computing, it may be advisable to give the children a series of problems in which they *work for speed.* Then the teacher leads them to see that they are not sufficiently speedy. The rule then follows.

Or, again, in the situation cited above, the study of *Crossing the Bar,* if immediate interest is not sufficient, a review of the author's life showing his personal characteristics pertinent to the setting of the poem may be made, and the question put, "How do you think such a man would view death?" Or, students old enough to have had thoughts about death may be questioned as to their opin-

ion upon the subject, and then the statement may be made, "In the poem to be studied Tennyson tells what he thinks death will be like."

Again, in American history, if the value to be controlled be to see how a strong centralized government grew out of the needs of strong local governments, it may be necessary in beginning *each* lesson to go back to this value and to have it restated so that it may be kept clearly in mind. The condition in which the problem was left at the last lesson, the new factors entering in at this lesson, and the new form which the problem takes because of these, may need to be reviewed in order to make the motive for studying this lesson as active as possible.[1]

Section 2. Review as an Aid in Solution.

It is necessary, also, to review past experience in order to bring to mind data that are essential for the *solution* of the problem raised at the beginning of the lesson. For here again the data may be forgotten, or may never have been known. In this the teacher may save the pupils much loss of time by explicitly bringing the needed data into the focus and thus obviate the necessity of searching for them.

In this connection two remarks are necessary. In the *first* place this searching is good exercise for pupils under some circumstances. When the material may be recalled by the vigorous use of memory, the teacher who *assists* the pupils to recall it is taking away from them a much needed means of growth. Such efforts at recall make for self-reliance and strength. Or, if the material may be found in books easily, the children should be required to find it.

[1] Cf. Chapter 10.

In the *second* place, it is a mistake to develop too much introductory material in any lesson. That is to say, the solution of the new problem should be near enough to the past experience of the child to make unnecessary the introduction of much new data. Long introductions tire the pupil before he comes to the real work. For instance, the phrasing of grammatical rules should not require the development of many words which are foreign to the pupil's vocabulary. If the rule must be stated in these words, it should not be taught until the pupils have sufficient breadth of scholarship to have met the words in other connections.

Illustrations.—A few examples will indicate some situations in which this review is advantageous. In the problem, How large will we have to make a bin in order to hold a ton of coal? it may be necessary to review the relation of pounds to volume in connection with coal. If the pupils *ought* to know it, or if they can easily find it for themselves in their arithmetics, this will not be advisable. In solving the fodder problems given above, the teacher may find it necessary to make an explanation of the devices used in the tables for tabulating the information. In the study of literature the teacher often finds it necessary to recall the meanings of words which have been previously studied. The cases where such reviews are advisable are multitudinous in the course of every day's work.

Section 3. Review for Functional Connection.

In Chapter 17 the question of application will be discussed. Without anticipating this later discussion, the following statement will set the problem of this section more clearly before us. When the solution of the problem

has been reached it is advisable to apply it to other problems of the same type. This is true because each solution is an instrument created for a specific purpose but usable in certain other situations. The more varied the uses to which it is put, the better will be the grasp upon it.

Now its use or purpose may be exemplified in two places, either when the problem is raised or when the solution has been reached. For instance, it has been said repeatedly that one way of securing a motive is to create a breakdown in control, for then the pupils will see the purpose of the lesson to be studied. At that point functional connection is made with past experience. But frequently the teacher is able to secure the motive by an appeal to immediate interest, and then functional connection may not be made at the outset. In this case the method of control worked out may still be used in other situations after it has been learned. Indeed, even when the functional connection is made at the outset, other applications may be made later. But in every case this connection serves as a means for recalling past experience, and in so far as the teacher intends it to be for that purpose it is germane to the discussion of this chapter.

Illustrations.—Whether the pupils learn the rule for divisibility by three because they feel the need of speed for controlling certain generic values or because of immediate interest, in either case, after the rule has been learned, it serves as a means for reviewing past experience when it is applied to work which the children have already been doing by the slower method. Again, if the *Psalm of Life* is studied because of immediate interest, the ideas the pupils have had previously may be called up when applications are made. In studying physics, even when no at-

tempt has been made to provide a motive for study other than those used in connections with all subjects, after any principle has been studied, frequent and wide application may be made to problems that lie within the everyday experience of the students. Similarly, in the study of history, even when no attempt is made to strengthen the motive, application of the principles discovered will serve as a means for calling up past experience.

Section 4. Review of the Previous Lesson.

Under some circumstances the teacher may feel the need for reviewing the previous day's lesson before beginning the new lesson. This is done wherever drill is necessary in order to fix the facts in mind. It is also done when the new lesson grows out of the old lesson. Such review is probably not necessary when short poems in literature are being studied, and when in such case the poems are not studied for the facts they contain. Each poem being an isolated unit, it may have no functional connection with succeeding units. Likewise, it will not be necessary when pupils are drilled for a number of days in an arithmetical process. For each succeeding day continues the drill, and the whole "new" lesson is a review of the previous day's lesson.

The Time for Review.—A simple matter of mechanics is involved in answering this question. Should the reviews of past experience be at the beginning, the end, or the middle of the recitation? To facilitate the discussion the reader is asked to glance at Chapter 19 and to observe that the recitation may be divided into Preparation, Development, and Application. Now, review for the sake of motive must, of course, occur in the Preparation. The

review of the previous day's lesson usually occurs at the very beginning of the Preparation. Review for functional connection occurs usually in the Application, but may occur in the Development. Review for assistance in solution is sometimes put in the Preparation, sometimes at the beginning of Development as an introductory step, and sometimes is introduced wherever it is needed in the Development. It seems advisable to exclude it from the Preparation. But where in the Development it should be placed is a matter of individual preference. Some teachers prefer to clear the ground before beginning the solution; others claim that this procedure gives too much preliminary assistance and indicates too obviously the direction which attempts at solution should take. The experienced teacher who has a mastery of the technique of teaching depends largely upon his feeling of the fitness of the time and place.

CHAPTER XII.

CONTROL OF VALUES.

Section 1. Psychology of Control.

Resumé.—At this point it may be well to restate the line of development pursued up to the present time. The aim of education is to assist the child to appreciate the values of life and to get control of them. Subject-matter is a means to this end. It is composed of ways of acting which are worked out by experience in increasing control of values when that control is insufficient. It possesses definite structure interdependent with the function. The business of teaching is to make these ways of controlling values accessible to the pupils. Theoretically, the way of acting should be introduced when the pupil is conscious of lack of control. But in so far as the subject-matter directs rather than follows the child there is necessity for securing motives for its study. Among other methods of securing motives to such study there is that of creating situations in which the pupil feels his lack of control, or is conscious of a need for the subject-matter. When the lack or need is felt the problem arises. By this we mean that the intellect turns upon the loss of or failure in control and seeks to find out exactly what is wrong. At this point we are prepared to ask: How may the difficulty be remedied? How may the problem be solved? How may the need be satisfied? How may control be secured?

Habit and Control.—In certain cases where control is temporarily lacking, habit is the agency by which it is provided. The *familiar* situation is the type to which habit ministers. Whenever a familiar sort of control is temporarily lacking, experience turns back upon itself and brings out of its margin certain ways of acting which it has found satisfactory on former occasions. Illustrations of habits in the narrower sense of the term are unnecessary. But a few illustrations of the broader use of the term may be given. Whenever we need to translate a sentence we revert to the paradigm. When we wish to guide our moral actions we recall the ten commandments or other ethical principles. Whenever we wish to use laws to control values we revert to the statute books. Whenever the Presbyterian needs direction in his religious life he may refer for guidance to the Confession of Faith.

Reasoning and Control.—It is not our purpose to discuss the relation of perception, conception, and judgment to control. It will be sufficient to treat of the two extremes, habit and reasoning, and leave the others which lie between to be worked over by the reader.

General Statement.—When a situation arises wherein lack of control is recognized, it resolves itself around two foci—the new way to be organized and the material at hand by which the new way is to be organized. That is to say, the mind distinguishes these two phases. These are sometimes referred to as the end and the means, sometimes as problem and data. A third phase is that of organizing the data so as to arrive at the new way, and this, too, has two phases—the *attempts* to arrive at the new way, and its *final organization*. A fourth phase is the process of verification. Without going into the rather abstruse

psychological relations existing among these phases, which would reveal the inherent unity of the whole process by which the new way is arrived at, we may roughly distinguish five phases of the process of control—problem, data, hypotheses, logical organization, and verification.

The Problem.—This has already been discussed. The method by which it is raised has been stated above to be that of creating a breakdown in the control of values. Its pedagogical applications are reserved for the next section.

The Data.—This corresponds to the substance of the term "relevant past experience." For whenever a new way of acting is to be organized (the solving of the problem) experience falls back upon old ways with which it is familiar and therefore knows how to handle. These are the given things—the data. From all this past experience, that which can be adapted in reorganization for the new purpose is used.

The Hypothesis.—It does not always happen that a problem is solved at the first attempt. We scrutinize the situation to clarify the problem and to select the data, and then we attempt to organize the data so as to produce a satisfactory solution. Sometimes we fail. Then we make another attempt, which also may fail. This process is continued until the right hypothesis, or plan, develops, and a satisfactory solution results.

The method by which the hypothesis, or tentative method, is discovered can be stated only in a general way. It depends upon association. An hypothesis is a relation among data, of such a nature as to allow them to be organized so as to solve the problem. The relation is often se-

cured in a haphazard way, by chance. Its discovery depends partly upon learning or detailed knowledge of the data, and partly upon sagacity,[1] or native and acquired ability to see just such relations.

Logical Organization.—The path by which the final and correct method is secured is devious. It twists in this direction and that, leaps ahead, returns upon itself. For, in endeavoring to find the desired relation reason seizes upon each clue available and follows it out until it leads to the truth, or until it is discarded for a clue more promising. However, once the right plan has been discovered, the whole situation is re-examined and reorganized. The data are arranged in such a way as to produce the best organization, which is called a logical organization.

Verification.—At every stage of development of any method of procedure it is tested to see if it is satisfactory. Different terms are used to indicate this process. Any hypothesis will be accepted if it "works." If we secure control by means of it, it is said to work. Another statement is that it "satisfies" us. Another that it is "in harmony with all the data, none contradicting it."

Illustration.—This sketchy account of the process by which control of a value is secured may be made clearer by an illustration. Goodyear worked for a decade to find a process by which raw rubber could be utilized for commercial purposes. This required that it should not crack in cold weather nor melt in warm weather. The problem arose in his mind when, during a visit to New York to sell a patent for a life preserver, he was told of the great possibilities in rubber if it could be made usable. His data were

[1] James, "Psychology," Vol. II, pp. 343-8.

the whole of his past experience, but particularly a slight knowledge of chemistry and mechanics, and some raw rubber. He tried one hypothesis after another. (1) Mechanical mixing and kneading (failure); (2) mixing magnesia with rubber gum (failure); (3) boiling the gum with magnesia in quicklime and water (partial failure, the slightest acid, as apple juice, making the product sticky); (4) mixing with aqua fortis (partial success, worked with thin material but not with such heavy material as government mail bags); (5) mechanical mixing with sulphur (partially successful); (6) by chance, in showing this latter product to a friend, a piece dropped on the stove, and he found to his surprise that heat had produced the desired qualities.

It will be observed that some of the hypotheses which failed to produce the complete result provided suggestions for the final process.

To illustrate the logical organization it may be stated that the inventor prepared a plan for vulcanizing rubber, which omitted many of the failures he had made and included three things: (1) sulphur and rubber gum, (2) mechanical mixture of these, and (3) heat. He has here organized his control (solution, or way of acting) in his best possible way.

Verification came when the rubber was subjected to ordinary heat and cold and was found still to retain its shape and consistency.

Section 2. Application to Teaching.

Original Solution and Text-books.—In solving problems two quite distinct sets of circumstances may be found. In the *first* place, the pupil may work the problem by his

own efforts. He may furnish his own data, hypotheses, and solution. Or, in the *second* place, he may use a textbook or appeal to the teacher, thus having the solution worked for him. In the preceding section we were dealing primarily with the first case. The second case may compel us to modify our statement of procedure. The two sets of cases will be discussed in connection with each topic.

The Problem.—In Chapter 9 we discussed the raising of the problem, and in Chapter 19 this is schematized as belonging to the preparation phase of the lesson plan. But the problem cannot be laid aside when we begin to solve it. For, in the *first* place, we have still to locate the exact problem. For instance, when an automobile breaks down, the problem is how to get it going again. But immediately the mechanic examines the machine to find *just exactly* what is wrong. He may search in the carbureter, in the battery, or in a hundred other places.

This process of exactly locating the difficulty sometimes takes years. The illustration from Goodyear's experiments, given as efforts at finding a satisfactory hypothesis also illustrates this. For ten years he tried to find exactly what was the reason why rubber would not respond to his efforts. The recent investigations in regard to yellow fever in Havana show how serious the pursuit of the difficulty may be. Some investigators and patients lost their lives in trying to find out whether yellow fever was spread by contagion or by mosquitoes.[1]

In school work, it is also necessary to locate the exact difficulty. For instance, when the problem, if 2 boys build a sod house in 3 days how long will it take 4 boys

[1] De Garmo, "Principles of Instruction," p. 38.

to build a house? is given, the crucial difficulty is found in the fact that it will take a shorter rather than a longer time. In manual training, when paint will not mix, search must be made for the repelling element. In assignments which have been given, the pupils say, "What does this mean?" thereby seeking to locate the exact problem. When a boy is bad in school, the teacher's problem is to help him to be good. But in doing this the first thing necessary is to find *exactly* what is wrong with him. Is it nervousness, illness, irresponsibility, or meanness?

Value to Pupils.—If the pupil is taught to examine his problem carefully to discover just what is wrong, half the intellectual battles of life are won. For the solution in the vast majority of cases follows as soon as the difficulty is located. Doctors say that in most cases their greatest problem is that of diagnosis. If they can find out what is wrong with the patient, treatment often becomes a minor matter in the case. In so far as the habits and ideals of keen analysis may be carried over into later life, an excellent training in both is secured.

Pupils should be brought face to face with the analysis of their problems. It is wise to bring them up against the problem, and instead of coaching and guiding them before they have time to think, it pays to wait in the recitation long enough for them to wrestle a while independently with it. For instance, the following is an example of what ought not to be done. A writer says, "To illustrate the method of teaching addition of fractions the following examples are given. (It will be understood that reduction of fractions has been taught before this subject is reached.) Look at these circles and fractions as I hold them before you. How much is $\frac{1}{2}$ of a

circle and $\frac{1}{2}$ of a circle? $\frac{3}{4}+\frac{3}{4}$? $\frac{1}{4}+\frac{3}{4}$? $\frac{3}{4}+\frac{1}{2}$? $\frac{1}{2}+\frac{1}{4}$? $\frac{3}{4}+\frac{3}{4}$? $\frac{3}{4}+\frac{1}{2}$? $1\frac{1}{4}+\frac{3}{4}$? $1\frac{1}{2}+\frac{3}{4}$? $\frac{1}{2}+\frac{4}{8}$? $\frac{1}{2}+\frac{3}{8}$? $\frac{1}{4}+\frac{3}{8}$? $\frac{1}{4}+\frac{4}{8}$? $\frac{1}{2}+\frac{3}{8}$? Let us now express in figures the answers you give me; $\frac{1}{2}+\frac{1}{2}=1$; $\frac{3}{4}+\frac{1}{4}=1$; $\frac{1}{4}+\frac{1}{4}=\frac{2}{4}$; etc. Do you see how we added the halves and fourths? How did we add the fourths and eights? Give an example adding halves and fourths, fourths and eighths. Your lesson tomorrow will be these fifty problems on the board (or chart)."

It would have been more stimulating, more rapid, and less like spoon-feeding for the teacher to have begun thus: $\frac{1}{2}+\frac{1}{2}$; $\frac{1}{4}+\frac{2}{4}$; $\frac{1}{2}+\frac{2}{2}$, etc., for review, and then to have put down $\frac{1}{2}+\frac{3}{4}$ without other comment than "How do you do this?" Then let them think for awhile. Nine times out of ten they can solve the problem. If not, *then* give them the circles and say, "Study it out with these." This gives a concrete basis for their thinking. The other minces too much, and leads to the apprehension of a rule rather than of a process. It shows a certain amount of skill on the part of the teacher, but it is deadening to the pupils. Any teacher who does not give pupils a chance to *think* their problems out is preparing for their rapid elimination from school.

Series of Problems.—The *second* reason why the problem cannot be laid aside after its initial raising is that in the vast majority of cases the initial problem differentiates into a whole group of subsidiary problems before the solution is finished. They occur in series one after the other, as attention swings from one *phase* of the initial problem to the other.

Illustrations.—An illustration may be given of such

a series, coming from child life outside of school. [1]The main problem was, "How to establish a church which we and other children would truly like to attend." The following series arose:

(1) "Were other children interested in this? How could we interest the children of our own neighborhood in it? We found that several of them were, that a number of them would come out of curiosity, that a number of them did not like to go to church with the grown-ups, and for one reason or another some ten or twelve promised to come at first.

(2) "Where and when should we hold services? We interested our parents, and my mother donated a back room upstairs on the condition that we should fix it up. We would hold services Sunday morning, as that seemed to be the most convenient time.

(3) "What sort of music should we have? We purchased an old organ from the parents of one of the children. How should we pay for it? After careful thought we solved this problem by giving several magic lantern shows at our house, charging a penny admission.

(4) "Who should be preacher? My brother seemed most fitted on account of his earnestness, his interest, and his being some two years older than the rest of us.

(5) "Who should be choir and who congregation? A very serious problem. It was decided to alternate, each half should be choir one Sunday and congregation the next.

(6) "Where should we get our seats? The problem of constructing some rough wooden ones arose, but instead we obtained some straight chairs (each one obtained

[1] Quoted from a student's paper.

his own seat) and at our house we provided a few for the visitors.

(7) "Problem of constructing a platform for the minister. Each of us helped. Minor problems arose here, such as joining the boards together, width of platform, carpeting, etc.

(8) "Problem of choosing officers of the church, treasurer, ushers, etc. This was solved by appointing a committee who should select them.

(9) "Further problems of maintaining interest in the church, learning to pray 'in public,' of learning hymns, etc., were disposed of in similar ways."

In school likewise the same process occurs. We find it in such a simple problem in arithmetic as the following: Find the cost of 12 dozen oranges at 50 cents a dozen. The following problems arise: (1) What is to be found? Cost of 12 dozen oranges. (2) What is given? (a) 12 dozen; (b) 50 cents a dozen. (3) How find the cost? Multiply 12 by 50 cents. (4) How do this? From multiplication fact, $12 \times 50 = 600$, cost is $6.00. Again in history, De Garmo says,[1] "For instance, in the case of the frontier the main problem before the class would be to determine *the influence of the frontier in American History.* About this problem will cluster the gathering of historical facts, the influences that have a causal power, and the various channels through which these causes produce their diverse effects. In other words, the main problem will break up into a number of subsidiary ones, as, for example, what influence had the trapper's frontier upon that of the rancher? What modifying influences had the settlements immediately beyond the 'fall line'

[1] "Processes of Instruction," p. 82.

upon those below it? How did the frontier regions control legislation for internal improvements? for the distribution of the public domain? for protection to new industries, etc?"

Here, again, the teacher may help materially by having the children *stop* and think. To repeat, one great danger is that the teacher is likely to make the steps so easy and so much alike, that the pupil is busy all the time solving little problems and is never brought face to face with those that baffle him for the time being. It is, of course, just as disastrous never to help him. The only point insisted upon here is that he be left to think for himself for awhile, and *then,* when he cannot discover the difficulty or find an hypothesis, a hint may be given.

When reading text-books the same process occurs. Here the pupil, even when he goes to the text to find the solution of his problem, must first locate the problem in the text before he can find the solution. In doing this he is helped by the author, who uses various devices. He may state it in his topic sentences, in chapter headings, or in sub-topics. Sometimes when the author is not thoughtful about these things, the pupil receives a good deal of exercise in searching, or reads without an aim.

The Data.—While the problem is being determined the data are being collected. In writing themes, for instance, many data are collected before the organization is finally made. Usually more data are collected than are used. Here, again, the children should be taught to think out their themes before they begin to write. With older pupils it is a good plan to have them jot down on paper all the things they think will be of use in writing, and then, when they organize the material, that which is

needed may be selected. By this play of the mind over the whole field in a more or less haphazard way much material that might otherwise be missed will be gathered in.

In arithmetic problems the data are usually all contained in the stated problem. This practically suggests the solution in many cases. To avoid this and to make arithmetic more like life, where the data are not always, perhaps never, nicely labelled for us, some irrelevant data may be inserted, or some of them left out. For instance, questions of this type may be profitably set: Find the cost of building a cubical bin out of 2-inch plank, which will hold 5 tons of coal, at $7.00 a ton, lumber selling at $24.00 per M. In this an irrelevant fact is introduced and some relevant data are lacking. Problems which arise in manual training, gardening, and other perceptual studies furnish both these conditions.

Sources of Data.—In addition to the data found in memory, books may provide data for problems, if the children have easy access to them. Even sixth grade children are able to consult easy texts for material for which they are looking. The privilege of walking about reinforces their desire to find more information.

Finished products provide data, also. When a pupil is about to build a box he may be sent to a finished box to see how it is made. Women frequently get their ideas for making a dress from the examination of other dresses. So, also, when a boy cannot solve a problem he may consult another solved problem to see how it is done. (This becomes purely imitative only when the problems are alike.)

This scrutiny of the finished product produces alert-

ness of thought and keenness of analysis. Moreover, it is a method of collecting data which is of the utmost value in life. Observation of teaching by teachers, examination of other systems of business by business men, are both examples of this. One of the chief advantages of travel is that data are collected through observation of things as they are found operating. He who has to have some one stand by and explain how a thing is being done, is handicapped to the extent to which his guide is absent or is inefficient.

When the pupil *reads* texts to find, not data but the whole solution, he sees the author's data organized in their final form. He does not see the data which the author collected and discarded.

The Hypothesis.—What has been said concerning the locating of difficulties and the collecting of data holds for the process of forming hypotheses. In brief, that process is this: The teacher should give the pupils *time* to form hypotheses and attempt solutions, and when they fail, only enough hint should be given to enable them to attack the problem again with vigor. For instance, in pursuance of this plan a popular but rather useless arithmetical problem was presented to a class of juniors in the university who were working on the topics of this chapter. If they had been studying arithmetic, such a problem would not have been given. The problem was selected for its difficulty. "At what time between 5 and 6 o'clock do the hour and minute hands of a clock come together?" A motive was secured by introducing it as an illustration of the topic now under discussion. The problem was written on the board, and the request was made to work it. Watches were immediately produced by some,

and the hands turned around. This plan was soon discarded. After four minutes of work nobody had solved it. Individual work was stopped and suggestions were called for. The first suggestion was, "Draw a picture." Then the question was asked, "What data are given?" Replies, (1) While minute hand goes 60 minute spaces, the hour hand goes 5. (2) Minute hand goes 12 times as fast as hour hand. The teacher stated that the first of these led to an arithmetical solution, the second to an algebraic one. The students were set to work on the problem again. After three minutes, individual work was stopped, and three students reported that they had worked it. Hints were again called for. One student said that the minute hand gained 55 minute spaces in going 60, and that it had 25 spaces to gain. This method was agreed to by the teacher as being on the right track, and individual work was resumed. A few others then reached the correct solution which was then placed on the board in this form:

Minute hand goes 60 spaces while hour hand goes 5.
Minute hand gains 55 spaces in going 60.
Minute hand has to gain 25 spaces.

$\therefore$ Minute hand goes 25/55 of 60 spaces = 27 3/11 spaces.

Time is 5:27 3/11 o'clock.

The problem was hard for students who had not been working in mathematics for years, and not all secured the answer. But it serves to illustrate the theory that after a problem is stated time should be given to solve it without assistance, and that if failure ensues only enough assistance should be given to lead in the right direction until the pupil can finally go on and solve it for himself.

In discovering an hypothesis it is necessary to study the data carefully, weigh the items, relate them, and discriminate among them. One after another should be taken up and related to the others and to the problem to see if an idea will pop out from the combination.

When we *read* text-books much of this exercise is lost because we are presented with the hypothesis in the form of a solution. In other words, ideas secured from books are not so productive of mental exercise as those which are worked out by the pupil. Therefore, in such subjects as history, care must be taken, when the text is read, to carry on parallel with the text a development which will raise the problems, show the data present in the historical situation, and arrive at a position where it will be seen that what was done was the reasonable thing to do. This can be done in the assignment[1] and in the recitation, when, after or before the facts have been read, they can be thought through and interpreted by the teacher and the class.

Similarly, in literature, the problem of the selection can be raised, if advisable, before the selection is studied, and discussion carried on as to the solution, after which the author's solution may be taken up.

Moreover, in reading texts hypotheses are not, with young children, hypotheses in the sense that they are tentative. The fact that they are in books establishes their certainty. They are accepted on authority. This weakness may be obviated to some degree by the process of verification, to which we shall now turn.

Verification.—Once a solution has been reached how are the pupils to know that it is correct? *First,* in the

[1] Cf. Chapter 18.

exact sciences, it is checked up or proved. The answer is taken, and if the data can be deduced from it, the solution is judged to be right. *Second,* in manual training, cooking, and other perceptual subjects, the solution is correct if it does the work it is intended to do. If the joint is close fitting and strong it is good. If the cake tastes good and looks well the method of cooking is satisfactory. In language, if the audience readily catches the point, the story has been well told. *Third,* in the less exact and less perceptual fields the solution is said to be correct if nothing contradicts it. *Fourth,* so far as the individual is concerned subjectively, it is correct if it satisfies him. But all these cases may be reduced to a common standard, in line with our fundamental standpoint. Those solutions are adequate for us if they give us a control of values which satisfies us. The pupil will test it by trying it on to see if it works, by seeing if it contradicts no facts, or by checking it up. If it can stand these tests it will satisfy him. Sometimes it satisfies him when he does not submit it to these other objective tests.

At this point, when the process of control of values is completed, appreciation ensues. When an operation of importance is completed, experience stops and *appreciates.* We size it up, we enjoy it, if it is satisfactory. And in connection with this thought, the children should be encouraged in subtle ways to dwell upon a good piece of work for awhile. For, when the work gives complete control the experience is enjoyable, and if it does not give complete control, the dwelling upon it will bring out the defect so that it may be remedied.

When we *read* texts, and receive solutions, it is necessary to try them on in the same way. They must be

weighed, thought over, compared with other facts. This is rather easy on the perceptual level, but in abstract fields it requires a higher degree of critical ability than young children possess.

The question of logical organization will be discussed in Chapter 16.

CHAPTER XIII.

FORMS OF INSTRUCTION.

Section 1. "Telling."

Definition.—When the teacher "tells" pupils a fact or principle, what he does is to give them a *ready made* method of control. For instance, when a child does not know how to make a certain stitch in sewing the teacher may say to her, "I will show you how." In cooking, the teacher may explain and show the pupils how to cook starches. In painting, the pupils may be shown how to hold the brush and how to mix their paints. In arithmetic, the children may be shown the mechanical forms of solution, or they may be given the formula for the area of a circle. In writing, the forms of the letters are given, and in spelling, the order of the letters. In history, facts are told, descriptions given, pictures shown.

It is evident from a survey of a mass of methods of which these are types, that much has to be given to pupils ready made. [1]"It is clear that progress is rendered possible by the fact that we may assimilate and turn to our own use certain of the judgments that have been worked out by our predecessors. In this way we profit, not only by our own experience, but also by the experience of others. If this were not the case, each would have to repeat, step by step, the monotonous history of those who had preceded him, subject to the same sources of error

[1] Bagley, "Educative Process," p. 257.

and making all the mistakes and blunders that they had made. But through the organization of experiences in judgment form, the mistakes are gradually eliminated. Each generation inherits from its predecessors innumerable systems of judgments which represent years, perhaps centuries, of selection and elimination. It is hardly too much to say that, for every fact and principle that survives, a thousand false judgments and erroneous principles have been eliminated. The former constitute our intellectual heritage; the latter have been forgotten."

Lecturing.—When the teacher uses *only* this "telling" form of instruction, it is known as lecturing. This is used to a great extent with mature students in colleges, but almost never in elementary and high schools in regular work. Sometimes on special occasions "talks" are given, or the teacher relates a story. In the primary grades stories are told, but usually only as a basis for other work.

Text-books.—When teachers follow the text-book slavishly and without criticism we have another form of "telling." Only, instead of the teacher telling the facts, the text-book gives them, and the teacher then tests the children to see if they can remember and restate them. McMurry[1] indicates three ways of using text-books, *first,* memorizing verbatim; *second,* memorizing the substance; and *third,* learning the gist of the substance, and discussing it in class after reading, "so that the ideas in the book may be comprehended and appreciated."

Advantages of "Telling."—Ready-made methods of control have a large place and great value in education

[1] "The Method of the Recitation," pp. 120-1.

and life. When the feet are to be kept dry and warm, ready-made shoes are bought. When the house is to be lighted we turn the switch. When our health is to be improved we get some medicine from the doctor. When we wish to visit a friend we make use of the electric car. When we wish to paint the house we buy prepared paints. When a man desires to appease his hunger he eats the foods prepared in the kitchen or restaurant. These are only a few of all the methods of control that we accept without necessarily understanding them.

Moreover, they are efficient in giving control, not always perfect control, but they give reasonable satisfaction. Ready-made shoes keep the feet warm and dry, electric lights illuminate the house, the doctor's medicine helps the patient, the electric car carries us to our destination, the prepared paint beautifies and preserves the house, and the cook's food appeases hunger.

"Telling" is also in some cases satisfactory. The reason for this is that we can *use* a method of control in securing what we desire even when the method is ready-made. The forms of letters which are prescribed by convention will convey our meanings better, perhaps, than any we could invent. The same is true of orthographic forms. Receipts in domestic science are usually more efficient than those made by pupils by experiment. The facts of history cannot be gained except upon authority.

Moreover, if we did not use ready-made methods we would be as helpless as the first man, more so, in fact, for he had his ready-made instincts and reflexes suited to his condition to fall back upon. So "telling" in its broader aspect keeps the children from being incompetent. Life is so short that if they do not accept these inheritances

they will be able to make little advance, will indeed fall far behind the generation which bore them. The wild boys, who have been discovered, are object lessons in lack of control because of dependence upon their own efforts.

Section 2. Developing Subject-Matter.

Definition.—In order to discuss satisfactorily the weakness of "telling" it is necessary to explain the developing plan of teaching. By this term we mean that the child is taught not only to *use* but also to *construct* the method of control. He does not use a ready-made method. He works it out for himself.

Constructing the Method.—This has been discussed already. In the last chapter we saw that it consists in locating the exact problem, in gathering data, in discovering hypotheses, and in organizing the method into its best possible shape. The pupils start with their problem, they search, experiment, lead off in one direction, then in another, discover relations between facts, go back over the ground again, till finally light dawns and the method is secured.

Advantages of the Developing Plan.—In the *first* place, it assists the memory in retaining the method. This is true because there is a good deal of repetition, because it makes associations at every point of progress, and because attention is keen by virtue of the vigorous working of the mind.

In the *second* place, it enables the student to reconstruct the method when memory fails to recall it. If he begins with his old methods, by reorganizing them he may be able to reason the organization out again. To be sure, he may forget these also, but if he has once worked them out he

is more advantageously situated for reconstructing the method than if he had merely accepted the method, and had not constructed it.

In the *third* place, he has a better hold upon it when he uses it. He understands it better and understands better the uses to which it may be put. The motorman who understands the mechanics of his car is better able to control it than he would be if he had been taught only the way to turn the lever. The scientist who has worked the theory of evolution through for himself will be better able to apply it to problems than will the one who has accepted the theory on authority. For, after all, problems of the same type are not all alike. They differ, at least a little, and when they differ the method has to be modified. If the student has constructed it, he then can see better how it may be changed, and by being changed become more effective. He *understands* it.

In the *fourth* place (in amplification of the last mentioned advantage), when the method is remembered but fails to work, he can modify it to apply to the special conditions. And herein lies the weakness of the ready-made method. If it is accepted ready-made and breaks down, the user is helpless. But if he understands its construction, he can make it work again. For instance, when a coat does not fit, the customer may be helpless, but the maker can remedy the trouble. If the electric lights go out, the consumer is helpless, but the electrician can set them going again. If the medicine does not restore health, the patient can do nothing, but the doctor can re-examine the patient and compound other medicines that will be more likely to work. When the electric car stops, the passengers sit and wait, but the mechanic

sets it going again. When the food does not satisfy, the cook is the one who can change the method of preparation. In all these cases, the one who understands the method of construction is best able to set things going when some part fails to work. And this ability gives one tremendous advantage in practical life.

In the *fifth* place, the *habit* of thinking things through, of trying and experimenting, is a good one to form. Nor is this to be discounted because of arguments against formal discipline. (For we have identity of procedure and of substance[1] and ideals that do not need to be carried over.[2]) If the developing plan is carried on in *every* subject, then, in so far as the subjects are germane to life, there will be with life the closest identity of both procedure and substance. And, if the ideal of *understanding* is realized in every subject there will be no necessity for carrying them over to other subjects.

Questioning.—Questioning is the instrument upon which chief reliance is placed in using this method. By questions the teacher raises the problem, assists pupils to gather their data, suggests relations between the data, directs the investigation, recalls the pupils from following a wrong lead when they have spent enough time upon it, and puts to them the problem of organization. If questions were not used the children would go off on tangents, or would become discouraged in much of their school work because of not being able to see the relations or to find a way out of difficulty.

Text-books.—Text-books may aid in the use of the developing plan. For instance, in solving a problem, the

[1] Thorndike, "Principles of Teaching," pp. 235-249.
[2] Bagley, "Educative Process," pp. 203-217.

children may go to texts for some of the data. In history, when the problem has been discussed in the assignment, and the probable trend of events partially worked out, the text can be well used to furnish data, to verify conclusions, and to assist in clearing up ideas. The weakness in using text-books arises when the children do not go to them with a problem, or when they accept the conclusions without thinking them through. (This is discussed more fully in Chapter 18.) But they have their place in the developing plan, if they assist the child in thinking through his method of control.

Limitations of the Developing Method. — McMurry[1] gives three limitations. He says that not everything can be developed; *second,* that it is an extremely difficult method to follow; and *third,* that the intellectual treasures of the past lie locked up in books.

Not everything can be developed because, in the *first* place, many methods that the children can use ready-made are too difficult for them to construct. We have to tell them many things for which we cannot explain the reason. Excellent foods may be cooked without a knowledge of the chemistry of foods to show why the ingredients act as they do. Historical events are sometimes told to children without the reasons for the events being made evident. In the *second* place, not everything that might be developed ought to be developed. There is not time to do so. And even though it be true, as McMurry says, that nine-tenths of what is taken up in school is forgotten, it does not follow that only one-tenth of the school work should be covered, and that by the developing method. For undoubtedly some

[1] Op. cit., pp. 142-143.

of the methods of control that are most useful are such that they can not be developed.

That the developing method is extremely difficult to follow is undoubtedly true. If the test of efficiency were merely the asking of questions it would be an easy matter, but when the standard is that of giving the children the privilege of doing the experimenting, it is different. For questions may be merely the dress in which "telling" masquerades. Then, again, too many questions make the progress too easy and lead to puerile thinking. (Cf. Chapter 12.) Efficient use of the method does not depend upon questions, but upon the character of the questions; upon whether or not they stimulate thought.

A fourth limitation which McMurry mentions in another connection, is that it is open to the danger of wandering. The reason for this is that the teacher has temporarily to forsake the exact order of logical organization, in order to follow the lead of the children. But if the problem is kept in mind, if the solution to be arrived at is clearly understood by the teacher, this danger will be obviated, in part at least. Then, too, the teacher may think out how he will develop the lesson, and may determine the "pivotal" questions, to use McMurry's phrase. To be sure, he may not follow this sequence[1] because the children may not give the answers he desires. But with increasing skill in teaching he will be able to foresee more accurately; and at the worst, even if he has to discard his development plan, to have thought out *some* plan will be of assistance in making a new one when required.

Developing vs. "Telling."—What shall be developed, and what shall be given ready-made? We have no scien-

[1] Compare Chapter 16.

tific data upon which to base a method of procedure. Any statement made must rest upon an empirical basis. For my own part, it seems reasonable to say that those methods of control which will be the most useful and whose construction is within the power of the children, should be developed. All facts of temporary importance may be "told," unless very easy, and capable of rapid development. All principles, no matter though they be important, if at the same time their basis is beyond the children's power, may be given ready-made, or delayed till they can be worked out. But all the methods (principles or facts) which *should* be in the possession of the pupils because of frequent use, or of fundamental importance, and which the pupils can construct for themselves, may, as just said above, be developed.

To take a simple illustration from geography. The geographical conditions that make a city great should be developed, but the size of the city must be told. The first is within the power of children who are usually taught the facts, the second is not particularly important, and of course could not be developed since it would necessitate a visit to the city and the counting of its inhabitants. And again, the rules for division by fractions and for the extracting of the square root should not be developed in the eighth grade, the former because too difficult, though important, the latter because both too difficult and unimportant.

To avoid confusion, it may be said in concluding that both developing and "telling" usually occur in the same lesson. Some data are given by the teacher, some are collected by the pupils, some suggestions are made by the teacher and others by the pupils.

CHAPTER XIV.

METHODS OF DEVELOPMENT.

Section 1. The Field of Induction and Deduction.

We say commonly that *induction* leads from the particular to the general, and *deduction* from the general to the particular. If we seek to give this a functional meaning we may say that both seek methods of control, but that induction seeks to secure control over a number of situations by finding one method that will control them all, while deduction is concerned with the control of one situation which is sought by finding the class to which it belongs and utilizing the method of control common to the class. For instance, one desires to know if all the goods bought from his grocer are up to standard weight. He purchases scales and each parcel is weighed as it arrives. After a sufficient number of particular parcels have been tested and none has been found under weight, he may then say, "All the goods bought at this store are correctly weighed." Here is the method of control common to all the class (weights from this grocery store). This process we call induction. Suppose that, after such a conclusion has been reached, a friend should say of a parcel received from that store: "That feels as though it were under weight." If doubt is raised it is immediately dispelled by the reflection, "No, this store never

gives under weight." Here the process of deduction is applied.

Relation of the Two.—The two processes are not distinct in the sense that sometimes we use the one and sometimes the other. They are complementary to each other. The reason why we say that sometimes we are concerned with one and sometimes with the other is because we may have two different purposes in view at different times. For instance, when I have weighed a half dozen different parcels and find them all correct in weight, I may not be sure that all the grocer's weights are honest, but I may feel that there is strong probability of it. This is a *sort* of generalization, not absolutely certain but probable. When the next parcel arrives I am then justified in saying without weighing it, "This is probably all right." That is deduction. When I weigh it and find that it is correct, I may think of my generalization, and its probability will be strengthened. This is induction. Perhaps the meaning of this will be made clearer by saying that both are present *implicitly,* but that induction is made *explicit* when a method of control common to several particulars is thought of, and that deduction is made *explicit* when the control of the particular thing by the common method is thought of.

Explicit vs. Implicit Elements.—This may be illustrated in another way. Every particular situation that we control has its general bearing. For instance, every time a pen is used the habit of writing is modified. The accumulated results of this may be seen by gleaning over our writing at the age of six, ten, sixteen, and twenty. Every time we deal with the grocery store and find the weights

correct, our opinion of the grocer is modified toward greater trust in the honesty of all his weights. Every time an arithmetic problem is solved the processes involved are increased in strength and generality of application. In a similar way our reading modifies our views. A study of a poem has its effect upon our general view of life.

Moreover, every time a particular situation is controlled by reference to general methods of control it is modified. For instance, when a parcel comes from our honest grocer, as soon as we see it and the name upon it, it is no longer a mere parcel, it is the honest grocer's parcel, and the contents are treated quite differently from those of a parcel from a grocer of whose honesty we are not certain.

But, and herein lies a distinction which is fundamental to our discussion in this chapter, these processes are not always explicit. They may be carried on in the fringe of attention; may influence us unconsciously. They may be merely implicit. When they are made explicit both the particular and the general are in the focus of attention *together.* When they are there, and when we make the particular the end and the general the means, we have deduction. When for the sake of control of particulars we make the general the end and the particulars the data, we have induction.

The Field of Induction and Deduction.—If it is true that induction and deduction always accompany each other, and if, in addition, they occur in every lesson either explicitly or implicitly, it follows that if we make a distinction between the deductive lesson, the inductive lesson, and those lessons which are neither inductive nor de-

ductive, we must give some special meaning to the terms. This distinction lies in the explicitness of the relations. It depends upon the *conscious* content of the pupils' minds.

We may use the term "inductive lesson" when pupils *consciously* seek for a general way of controlling a group of particular situations, and *explicitly* relate each to the other. For instance, when they are trying to see how the adjective makes the meaning of nouns definite, they begin with particular instances and at the end compare these, and in the act of comparison the general truth comes to the surface. In this act of comparison, both particulars and the common relation are brought *explicitly* into the focus of attention.

We may use the term "deductive lesson" when the pupils *consciously* seek to control particulars by relating them *explicitly* to principles upon which they depend. For instance, they reason deductively when they say that this word is an adjective because it makes the meaning of the noun definite, or when they decide that oranges would not grow in Minnesota because of certain principles of climate.

The Informal Method.—The inductive and the deductive methods of teaching do not seem to cover all the cases. They undoubtedly cover all that are scientific, that explicitly utilize laws, rules, and principles. But they do not cover all of literature, or spelling, or language work, unless we broaden the meaning of "principle." Just how to teach all poems inductively or deductively is difficult to see. For instance, the children study and appreciate *Little Jack Horner* without referring it explicitly to any general principles of life, and without making any explicit generalizations about it. Indeed, if we tried to

do either it would be beyond the depth of first grade children, who nevertheless enjoy it intensely.

If, then, we use the terms, inductive and deductive methods of teaching only in reference to those situations in which we help the pupils to get control by having them consciously deal with principles in connection with the particulars to which they refer, we may use the term "informal" to describe those situations in which the control is secured without the pupils being consciously *aware* of any principles or using any *scientific* principles.

Control.—All of these methods are methods of securing control, a topic discussed in Chapter 12. The inductive method emphasizes in its data the *particular,* secures its hypothesis by comparison, and the generalization is the logical organization. The deductive method lays stress in its data upon the *principle,* secures the hypothesis by comparison, and the inference is its logical organization. The informal method has only particular situations consciously in mind in its data, and reaches a method of control that is considered only as applying to the particular situation.

Section 2. The Inductive Method.

The Five Formal Steps.—The Herbartian lesson plan, which is the best statement of the method of induction, has five steps,—preparation, presentation, comparison, generalization, and application.[1] The step of preparation includes the review of past experience, and the statement of the aim; the step of presentation deals with the teaching of particulars; the step of comparison, as its name indicates, deals with the comparison of these particulars; the

[1] C. A. and F. M. McMurry, "The Method of the Recitation."

step of generalization states the generalization which is secured by the comparison; and the step of application deals with drill upon this generalization and application to other particulars. These steps we shall discuss briefly from the standpoint elaborated in this text.

Preparation.—As stated above, the Herbartian preparation deals with the review of past experience and the statement of the aim. As was seen in Chapter 11, this review of past experience may be a review either of the previous day's lesson, or a review for the sake of raising the problem of to-day's lesson. It was also stated in Chapter 9 that only in those places where dependence was placed on immediate interest could the term "statement of the aim" be used. It was there pointed out that the teacher must often raise a problem, arouse a need, or create a breakdown in control, by reference to other interests of the child, and that the mere statement of the aim would not be sufficient in all cases.

For instance, in studying adjectives, rather than say, "To-day we shall study another part of speech," it is advisable to proceed somewhat after this plan. Presuppose that the thing of value in grammar is to see how parts of speech help us to express our ideas more definitely and easily. Suppose the noun has already been described as a word which stands for a person, place, or thing. A review of the noun will be given to bring its function into the focus of attention. The children may be asked, *Why are we studying grammar?* The answer will be, *To find out all the parts of speech which help us to express ourselves more definitely.* Then the teacher may put on the board the sentence, *I want the pupil to bring me the book.* Then turning to the class he may say, *Do this for me.*

The pupils will feel the impossibility of doing as requested. *Well, why don't you do it?* the teacher may ask. The class will, in substance, answer this: *We don't know who is to do it, nor what book to get.* The teacher will add, *What must I do to this sentence before you can do what I want you to do?* Answer: *Add some more words.* The teacher may or may not say, *Those words will be our lesson for to-day.* But in any case, the problem is before them. They see if they are to get his meaning, something needs to be done to make it more definite.

Presentation.—In the presentation step the particulars are presented. From these the pupils by comparison are to get at the general truth. To that end stress is laid by the teacher in the presentation of each particular upon the element that will be found later to be common to all.

For instance, in the teaching of the adjective, the lesson may proceed as follows. The teacher writes upon the board,

I want the pupil to bring me the red book.

Teacher—*Can you do it?* Ans.—*No, there are several red books.* Teacher adds *smallest. Can you do it now?* Ans.—*Yes.* An afterthought—*But we don't know who is to do it.* Teacher adds *curly-headed* to *pupil,* then writes, *blue-eyed, curly-headed pupil,* and finally, *tallest, blue-eyed, curly-headed pupil,* asking after each one, *Can you do it now?* We will suppose that as the sentence stands, viz., *I want the tallest, blue-eyed, curly-headed pupil to bring me the smallest, red book,* the process of definition has gone far enough to indicate the particular

child and the particular book. The pupil so indicated brings the book.

Teacher—*Why couldn't you do it before?* Ans.—*Not definite enough.* Teacher—*What words gave definiteness?* Ans.—*Tallest, blue-eyed,* etc. Teacher.—*What did they make definite?* Ans.—*The pupil you meant and the book you meant.* Teacher—*Let us make this definite—What did 'tallest' make more definite?* Ans.—*'Pupil.'* Teacher—*What did 'smallest' make more definite?* Ans.—*'Book,'* etc.

Teacher—*Let us take another illustration. I am thinking of a dog.* Writes on the board, *It is a small dog. Do you know of what dog I am thinking?* Ans.—*No.* Teacher—*What is wrong with the sentence?* Ans.—*Not definite enough.* Teacher—writes, *It is a small, fat dog. Do you know now?* Ans.—*No.* Teacher—writes, *It is a small, fat, wheezy dog. Do you know yet?* Ans.—*No.* Teacher—writes, *It is a small, fat, wheezy, one-eyed dog. Do you know now?* Johnnie holds up his hand. Teacher—*Well, Johnnie?* Johnnie—*The grocer's dog.* Teacher—*Right. I saw him when I was coming to school to-day. What was wrong with the first statement?* Ans.—*It was not definite enough.* Teacher—*How did I make it definite?* etc., as in the former example. When enough of these have been covered the next step follows. It will be noted that in this, no generalization is made. The children only see that particular objects are made more definite by particular words.

Comparison.—In this step the common factor in the foregoing particulars is brought out. It may take a very little time. A question starts it, and the children do the comparing. The foregoing lesson may proceed as follows,

Teacher—*Name all the words that were added to make the meaning definite.* Ans.—The children give the list. Teacher—*What did they make more definite?* Ans.—*'Pupil,' 'book,' 'dog,'* etc. Teacher—*What parts of speech do you call the words, 'pupil,' 'book,' 'dog,'* etc. Ans.—*Nouns.* Teacher—*Now, who can tell me what part of speech these words make more definite?* The next answer should be the generalization. The last question stimulates them to complete the comparison.

Generalization.—In this step the pupils make the generalization. They state the common factor, the rule, definition, or principle. The children's answer in this case is, *They all make the noun more definite.* Then the teacher may give the name, saying, *All words that make nouns more definite are called adjectives.* The pupils may be called upon to give the definition,—An adjective is a word that makes a noun more definite in its meaning.

Application.—In this phase, drill and application take place, subjects to be discussed later in chapter 17.

In the lesson on adjectives, drill may be carried on as follows: Teacher—*What part of speech is 'tallest'?* Ans.—*An adjective.* Teacher—*Why?* Ans.—*Because it makes the noun 'boy' more definite.* (This is an example of deduction.) Teacher—*What part of speech is 'curly-headed'?* Ans.—*An adjective,* etc., etc. The teacher might also ask the pupils to memorize the definition (a good practice), and perhaps in doing so might have them write it out.

In application the teacher may ask the pupils to compose other sentences in which they would try to make their meaning exact in this way. He may also have them collect cases in which they or others do not use enough

adjectives and so cause people to misunderstand them, and also cases in which they use more adjectives than are necessary.

Section 3. The Deductive Method.

When problems are solved by relating them to *explicit* general principles we have an example of what may be called the deductive method in teaching. Bagley[1] mentions four phases of the method—data, principles, inference, and verification. Data are the facts with which we start. Principles are the processes governing the solution. Inference is the process of solving, and verification is the testing to see if correct.

It would seem that the principles (processes upon which the solution depends) are also data in this case. And if such is the case another statement of the phases might be made,—problem, data, hypothesis, solution, and verification. This at least would be consonant with the terminology of chapters 12 and 13. The distinction between induction and deduction is that in induction only particulars are explicit in the data, while in deduction the principle is also explicit in the data.

Further Examples.—A few examples will indicate the method of utilizing the deductive method. We will take, first, a problem in algebra. The sum of $276 was raised by A, B, and C together; B contributed twice as much as A and $12 more, and C three times as much as B and $12 more. How much did each contribute?

The data here consist in the facts given in the problem, and in certain general principles already known to the pupils in algebra (otherwise this would not be a deductive lesson).

[1] "Educative Process," pp. 308-310.

The problem is to find how much each contributed. The hypothesis which comes after study of the facts in the light of the principles already known is to view this as a simple equation with one unknown (a principle already known, and therefore in the data). A further hypothesis is that it will be simpler to let A's amount be the unit rather than B's or C's. The solution logically organized is the following:

Let x=A's amount.
Then 2x+12=B's amount
and 3(2x+12)+12=C's amount.
Therefore x+(2x+12)+3(2x+12)+12=276
Expanding, x+2x+12+6x+36+12=276
Collecting 9x+60=276
9x =216
x =24=A's amount,
2x+12=60=B's amount,
3(2x+12)+12=192=C's amount.

Partial verification is secured by adding the amounts to see if they equal 276.

24+60+192=276.

Arithmetic.—Or take a problem in arithmetic: A young man selling tea on 2¾% commission, sent to his employer $875.25 as the net proceeds of one week's sales. What were his average daily sales?

The data are the facts stated in the problem together with certain principles already learned in calculating commissions and averages. The problem is to find the average daily sales.

The hypothesis in this case that appears to possess a high degree of probability after study of the facts in the

light of principles already known, are the facts that commission is charged on sales and that averages are determined by dividing the total amount by the number of days.

The solution in its final form is as follows:

100 %=sales.
$2\frac{3}{4}$%=commission.
$97\frac{1}{4}$%=net proceeds=$875.25.
100 %=100/97.25×$875.25=$900=total sales.
Sales for 6 days=$900.
Average daily sales=1/6 of $900=$150.

Verification follows thus:

$150	
6	$900.00
$900	24.75
.02¾	$875.25
$24.75	

Grammar.—In grammar the following is an example of deductive development. Parse the words in the sentence, *We came to town to-day.* Here the data are composed of the facts and rules of grammar which the children already know. The problem is to interpret the words in terms of these principles. To a certain extent, depending upon the grammatical skill of the pupils, the hypothesis about the relations of the words will be suffused with conviction.

The solution will be as follows: *We* is a pronoun *because it stands for a noun,* etc.

Verification in this case comes chiefly by a further scrutiny of the words to see if an error has been made. It rests much more upon the mere feeling of conviction

and satisfaction than do algebraic and arithmetical problems, since the solution of these latter can be gone over in reverse order.

Section 4. The Informal Development.

For want of a better word we use the term 'informal' to indicate those developments in which no *conscious* use is made of *explicit* principles. As said above, it is a matter of course that both induction and deduction are implicit in every lesson, but in a great number of lessons we do not refer to them explicitly. Unless the idea of explicit use or formation of principles is used, there can of course be no such thing as inductive as over against deductive lessons. And if the concept of explicitness differentiates them, then there are lessons which do not come under either of these heads.

A good example of an abortive effort to teach some poems by the inductive method is the teaching of Holmes' *Old Ironsides* in a recent publication. It seems from a careful study of this poem and its historical context that the author's problem was to save the ship from being dismantled. Yet in the *Model Lesson* referred to, the writer leads the pupils to draw the generalization: "In the life of a nation noble sentiment is a vital force." This, of course, is true, but Holmes had no such lesson to teach. He merely wished to save the ship, a specific problem. He made no attempt to moralize. Nor did Holmes state any principles which would govern the solution. He does not state what was the custom of disposing of historic ships. Nor does he examine particulars to find out what to do with them. The effectiveness of the appeal is built upon the particularity of the pictures. The attention is

centered upon the ship—the individual. Pride is appealed to, and pity, and a sense of justice. But it is pride in the ship, pity for the ship, and justice toward the ship. His purpose would have been defeated if he had built up his argument by explicit induction or deduction. It would have seemed forced in such a poem.

When the author makes his excellent preparation by recalling the history of the ship and the occasion which called forth the poem, and develops with such marked literary skill the bearing of the words, the imagery, and the emotions upon the central theme—the preservation of the relic—he should stop. Beyond that point his lesson is no longer a literature lesson, it becomes ethics. Ethics is, of course, worthy of study, but it is claimed, and justly, by literary critics that literature performs its ethical function most effectively by implication.

In literature at least we cannot always develop lessons either inductively or deductively. Likewise, in much of the work of the early grades, principles are not formulated. We must be willing to allow generalizations to grow in part unconsciously.

On the other hand where induction and deduction give better control, they must be used. Unconsciously gained principles must on proper occasions be brought to the focus of attention, analyzed, and developed. They are the factors which make naïve experience scientific. But we must not forget that frequently we do a thing first and search for the reasons afterwards.

Control.—The procedure in Chapter 12, in discussing control of values, applies to the informal method. One way of defining the field is negative; in all those attempts

at control where we do not explicitly formulate principles or explicitly deduce methods of control from principles we use the informal method. In a positive way we may state that it is the method that lies nearer to intuitions, to artistic production, and also to those mental states where we do not consciously state the principle which directs us. Principles we have, of course, in every situation, but it sometimes weakens methods of control to over-intellectualize them.

CHAPTER XV.

PSYCHOLOGICAL AND LOGICAL ORGANIZATIONS.

Section 1. Introductory.

In Chapter 11, two phases of the process of securing a method of control were discussed. It was there stated that reason, after working back and forth seeking for a solution, finally arrives at one and formulates it in as logical a form as it can. For the first of these phases, the tortuous, and uncertain groping and reaching for a solution, the term 'psychological organization' may be used. To the second, the certain, clearly defined, direct formulation of the solution, the term 'logical organization' may be applied. For instance, after many years of experimenting, Goodyear found the method of vulcanizing rubber. The process of experimentation by which he arrived at his method may be called 'psychological.' The process by which he organized his receipt into its best form may be called 'logical.' Again, the process by which Newton arrived at the law of gravitation may be called psychological. The formulation of the law in its best form as we now have it may be called logical.

Under some circumstances we are concerned only with the logical organization. For instance, it makes little difference to the tailor how long it took the inventors of the sewing machine to invent it, or how many errors they made before they were able to put it into final shape.

He is concerned only with the efficiency of the final form. Or again, the reader is less concerned with the growth of the conception of *King Lear* in Shakespeare's mind than with the efficiency of the tragedy as it stands. The circumstances under which we are concerned only with the logical organization are those in which it is used without being constructed *de novo*.

But under other circumstances, viz., those in which we are concerned with the construction of the method of control, we must pay attention to the psychological organization. And it will be apparent at once that for the teacher, who is helping the child to construct his methods of control, it is of frequent use and of paramount importance.[1]

Section 2. The Daily Lesson.

In an earlier chapter the structure of subject-matter was discussed, and at that time it was pointed out that the structure should be logically arranged and in such a way as to fulfill its function. At this point the relation of the logical to the psychological order of the subject-matter may be discussed in connection with the question, —Should the recitation follow, point by point, the logical outline of the day's lesson (the structure)?

It is of course impossible to lay down a definite rule. But if the logical outline is followed closely there is little opportunity for any original thinking by the pupil. For if it be true that the adult who first created the outline did so after experimentation, it is evident that a child could not construct it without a similar tortuous method. And hence, if the child is to be allowed the chance to think it

[1] For an excellent philosophical discussion of this whole matter, the reader is referred to Dewey, "The Child and the Curriculum," University of Chicago Press.

out for himself, we need not be surprised if the logical outline is not followed.

Illustration.—The following lesson was organized and taught to a class of second year students in the high school, in order to get a concrete illustration of the fact that in developing a lesson, fairly well organized from the logical standpoint, a teacher may not follow the logical outline step by step, if the pupils are allowed a reasonable amount of initiative and self-direction in attacking the problem. This particular subject-matter is composed of a number of topics which are more or less disconnected, and do not each grow out of the preceding.

It was taught at the beginning of a study of English history in order that the students might become acquainted with the geographical conditions of the British Isles, and might get some idea of their outstanding local and international characteristics. The subject-matter to be taught was organized by the teacher in the following relatively loose way.

Function of subject-matter is to solve the following problem: What is the relation between the geographical conditions and the navy, industries, wealth, cities, and national life of the British Isles?

Structure of subject-matter. The solution is made up of the following contributions:—

I. Geographical conditions:

1. Islands (isolated from mainland),—
   a. in size 120,000 sq. mi.=(Missouri and Arkansas).
   b. in population 40 million=(Missouri and Arkansas,+35 million).
   c. many excellent harbors on coast line.

2. Mountainous in parts and level in parts.
3. Great deposits of iron and coal close together.

II. Items affected by geographical conditions:

1. Navy largest in the world—kept as large as any two others, necessary for protection,—
   a. from invasion—I, 1.
   b. from starvation—I, 1, a, and b.
   c. for shipping—I, 1, c, and II, 2, c, and d.
2. Industries,—
   a. fishing—I, 1.
   b. agriculture (small for dense population)—I, 2.
   c. shipping (greatest in the world)—I, 1, c, and II, 2, d.
   d. manufacturing (second in quantity only to the United States) great because of shipping facilities, low wages, free trade, and skilled workmen, cheap fuel.—I, 1, a, and I, 3.
3. Wealth greatest per capita in the world. Money invested all over the world—II, 2, c, and d.
4. Cities—I, 1, c. In England, London and Liverpool; in Scotland, Glasgow and Edinburgh; in Ireland, Belfast and Dublin.
5. Nationalities—a. Wales, because of mountains.
   b. Scotland, Lowlands of English origin. Highlands different because of mountains.
   c. England.
   d. Ireland, because of being an island.

Note.—**The numbers after the points in II indicate those points in I which have an influence upon them.**

The following report was given by the teacher: "I kept the outline in mind, but proceeded to let the pupils attack the problem in whatever way occurred to them. After a short conversation about the study of English history and its value for American people, I unrolled the map, and after they had looked at it for a moment gave them the direct problem, 'What are the things that make the history of one nation different from that of another?' I expected to receive two replies, 'The people of the nation,' and 'The geographical conditions.' The pupils gave the second one first, and that being the point I was after I let the other go. I had them illustrate this from any source they could, and they spoke of Spain when discovering America, of Greece, and of China, while I suggested Switzerland. I immediately followed with another problem, 'What are the geographical conditions of the British Isles that have affected its history?' I expected to receive the reply, 'Its being an island and isolated from the mainland,' but from the previous discussion, and I presume from its configuration as shown on the map, one boy said, 'Its good harbors.' This required a pointing out of the harbors, and in connection with them, of the chief cities of the two islands, London, Liverpool, Glasgow, and Belfast, to which I added Edinburgh and Dublin, the capitals of Scotland and Ireland, because of their future usefulness. This brought up, by some small intervening steps, the question of shipping, as implied in the idea of good harbors, and I gave them a number of facts about the importance of the shipping of England. This line of attack was now exhausted for the purpose of the recitation.

"Then I returned to the original problem, 'What other

geographical conditions affect the history of the British Isles?' The answer was, 'The mountains,' and we proceeded to point out that the islands were level in part and mountainous in part. When asked how this affected the history, they saw by lines that were drawn, that the mountains in the west of Great Britain were coterminous with the Welsh nation, and that the mountains in the north were the home of the Highland Scotch, while the level land was populated by the English and Lowland Scotch. It was pointed out that the Cheviot Hills mark a political barrier, although the Lowlanders of Scotland are of the same origin as the people of England. Then, to bring in the Irish nation, I asked, 'What part of the British Isles remains unaccounted for?' whereupon they mentioned Ireland, and explained in terms of the geographical conditions that it is an isolated island. At this point I thought it wise to show them the size of England in terms of Missouri and Arkansas, and to compare the population of these two areas in order to show the density of population of the British Isles. This led me to ask the question, 'How do these people live?' and they replied from general information, 'By manufacturing.' Then I asked, 'Where do they get their fuel?' and we discussed the extent of the coal deposits of England. When the question of raw materials arose the fact was brought out that there is much iron in England, but that the bulk of raw materials is brought from other countries. This re-emphasized the question of the shipping industry. I repeated the question, 'What other industries have they?' and the students suggested agriculture, but they were of the opinion that since England is so small and the population so great they would be unable to feed themselves, and

would therefore be dependent upon other nations, and liable to hard times or even starvation in war.

"For the moment I forgot the industry of fishing, and returned to the original problem, 'What other greographical conditions would affect its history?' We had secured by direct questions the geographical facts that the islands have excellent harbors, and that they are mountainous in parts and level in parts; we had secured in following out these two lines, the geographical facts of its size and density of population, and of its deposits of iron and coal. The final fact that it is an island and isolated from the mainland, which I supposed they would give first, they had some difficulty in seeing, probably because it was so obvious, so I had to call their attention to it directly. This was done by the question, 'What advantage is it to England that it is insular?' and they replied that other nations could not invade it. I pointed out the flaw in this statement, viz., that other nations might invade it by the simple expedient of getting ships, whereupon they said that England would not be invaded if she had a navy large enough. We talked about the size of the navy, and when I asked the advantage of a large navy to England, they were able to bring together from the tangle of our discussion up to date, the three facts as given in the outline.

"At this point the reader will notice by checking up with the outline, that we had covered all the items we had intended to take up, except those relating to fishing and the wealth of England.

"If the lesson had been left at this point the work would have been covered, because we had seen the relationship between the different items and the geographical conditions. But while covered it would have been in a rela-

tively unusable shape because not properly organized. And so our next problem was that of logical organization. We did this by two *summaries*. First, we made a list of the geographical conditions, and of the *mere* facts concerning the navy, industries, etc. In this summary we brought in the industry of fishing which had been previously left out, as noted above, but did not bring in the facts concerning the wealth of the country, because after all it was related more directly to the industries than to the geographical conditions. In the second summary we took each item contained in division II and related it to the geographical conditions in division I, by the followng type of question, which I had the students frame. 'What geographical conditions affect the nationalities of the British Isles?' 'What conditions affect the navy?' etc. It will be seen that this summary not only related the items of division II. to the geographical conditions, but related them to one another.

"As a home assignment, the students were asked to synopsize the facts as given, in their logical order; and the worth of their work was gauged by their approximation to the logical outline as given in the preceding pages, which the students had not seen. I had intended to ask the following questions, which related to the problems of American conditions, but because of lack of time could not do it in that recitation: 1. Do these facts throw any light upon the reason why the United States thinks it requires a navy? 2. Might we expect the United States to divide itself into a group of separate nations because of geographical conditions? 3. If free trade is good for England, is the United States wise in having a high tariff?"

Suggestions.—The following observations might be made upon this lesson as typical of the teaching of a unit composed of a problem whose solution consists of a number of relatively discrete facts.

(1) If the pupils are given the maximum of liberty in their attack upon a problem the development of the solution is not likely to follow either the logical outline or the order which the teacher has thought probable, no matter how extended his experience. He cannot foresee what point the students will attack first. By reference to the logical outline it will be seen that the order in which the points were taken up were these: harbors, cities, shipping, mountains, nationalities, size and population, manufacturing, shipping, other industries, agriculture, island as isolated from mainland, and navy. If the recitation had followed the logical outline it would have been a serious loss to the amount of actual thinking, experimenting and relating that the students were able to put into the lesson.

(2) For the subject-matter to have its maximum value the recitation cannot be considered complete without a summary *in which every part of the structure is related to its function.*

(3) When the student is given the maximum of liberty of attack, the recitation is broken up into a series of problems and each step of the series grows out of the preceding. It will be noted that this recitation returned to the original problem three times, giving three groups of problems.

(4) The logical outline of the subject-matter is valuable for the teacher to use (a) as a standard of solution of the main problem, and (b) to keep him from going too

far afield in the recitation. He is held unconsciously or consciously to the main content of the solution.

(5) In a recitation, no matter how well such discrete subject-matter may be prepared and memorized by the teacher, frequently one part is omitted in the development under the stress of changing points of emphasis.

(6) In the summary the teacher is justified, while gathering up the subject-matter into a logical organization, in filling out those points which have been inadvertently omitted.

(7) In short, if the pupil is to have the maximum of liberty the teacher must be extremely careful not to demand in the development the following of a cut-and-dried order of solution. That is secured later in the lesson by means of the summary.

In view of the fact that the teacher who does not follow his logical outline in a cut-and-dried way cannot foresee what order of points the pupils will take, of what should his planning consist? It seems that the best method of procedure for the teacher in preparing the development is to think over all possible difficulties that may arise in the children's getting hold of the subject-matter, and plan out how these will be made clear to them. By doing this he will of course be compelled to work out many difficulties that will never occur, but he will be able to cope with all that do occur. Nor is this an amount of preparation in which the teacher exceeds that of other professional men. One of the greatest lawyers of the country attributes his success to the fact that when studying a case he always worked out all the possible lines of objection so fully that over sixty per cent. of his

material was never used. But the plan safeguarded him against failure and assured his successes.

So, likewise, the teacher must anticipate all the difficulties, and may, also, work out a probable plan of how the lesson should proceed. This has advantages, especially for a novice; he is not entirely at sea; he has *some* plan to follow. But the teacher should not feel that he must follow this whether occasion warrants or not. The plan should be fluent and easily suited to his pupils' convenience and best work.

The Summary.—The logical organization is arrived at in the summary. This is always the point at which the pupil is asked to state the main points discussed. It occurs whenever the development has gone far enough to make it desirable. And it is advisable to make it whenever the children have covered so much material that there is danger of their forgetting. Sometimes one will have summaries at a half dozen points in a recitation, sometimes only at the end. The summary should be made by the pupils unless the lesson has been a very difficult one. In the lesson preceding, the summary was not made till the end.

Section 3. Incidental and Formulated Study.

Another question in whose answer the distinction between logical and psychological organization is involved, is this. Should subjects be taught incidentally or in formulated courses? For instance, should arithmetic be studied as arithmetic and for its own sake, or should it be studied only when and as it is needed for other subjects?

Advantages of the Incidental Method.—The arguments in favor of the incidental method are these. *First,* it provides a strong motive for study. If the pupils in playing a game need facts of addition to help them, they will study them with avidity. *Second,* it gives a practical motive for study. Pupils will see its practical utility, and hence will get a better hold upon it. *Third,* it is the common method of learning. In life out of school we commonly dip into this subject or that just as we need it, and to the extent to which we need it.

Advantages of the Formal Method.—In favor of the logical organization of the subject, it is claimed that we cannot get a good grasp of any subject unless we learn its principles and the inter-relation of its facts with these. For instance, a knowledge of the history of one's native country will not be efficient if it is only dipped into here and there as required in some other connection. What is needed for thorough knowledge is a chronological and topical study of the history from the beginning to the present. We must study history as history, arithmetic as arithmetic, and grammar as grammar in order to get organized knowledge of them.

But if what we have seen heretofore is true, that in the normal rational process we have both, it follows that there is a place for both the incidental and the formulated studies of subjects in a school curriculum. The incidental study will continue until we reach the point where formulation is necessary; for at *some* point the pupils will have an actual or potential need for it.

Relation of Each to the Course of Study.—That we recognize this in constructing a course of study is ap-

parent. For instance, up to the seventh or eighth grades the children have been studying grammar incidentally. They begin at home and they continue at school. The teacher corrects their errors, upon authority. He tells them to say "They are not" instead of "They ain't," "May I?" for "Can I?" etc. Then in the seventh grade, the eighth grade, or in the first year of the high school, we decide empirically that the time has arrived for a logical formulation of grammatical facts. So, also, in history, the children in the first grade are taught about Washington and Lincoln, in the succeeding grades many illustrations are drawn from history, and finally at some point the formulated study of history takes place.

We cannot get along without the incidental study of the facts of a subject. Neither can we get along without its formulated study, if we are to get the most efficient control of it. The serious question to be decided is at what point in the curriculum the formulated study should begin.

Section 4. Specific Subjects.

In presenting the facts in any subject the problem emerges again. Should the pupil take them up in their logical order, or in their psychological order?[1]

In those subjects in which a good deal of incidental study has already occurred, the logical order may be followed. Such is, for instance, the case with history or grammar in the eighth grade. But in those subjects which are relatively new to the pupils, new both as to principles and terminology, the psychological approach can be made with advantage. Two or three illustrations will make this clear.

[1] F. Burk, "Genetic vs. Logical Order in Drawing," Ped. Sem., III, 296-323.

Primary Reading.—In primary reading, the logical order is letters, syllables, words, and sentences. But it has been proved beyond the shadow of a doubt that the psychological point of approach is through the word, or better still, through the sentence. Sentences, words, letters, syllables, is the order of strongest motivation, but this is not the logical order.

Geography.—Again, in studying climate in physical geography, the logical order as laid down in one text, is the following. (1) The earth as a Planet. (2) The Atmosphere. (3) Distribution of Temperature. (4) General Circulation of the Atmosphere. (5) Storms. (6) The Moisture of the Atmosphere. (7) Weather and Climate. The teacher may, however, vary this order as follows:

A. (1) What makes wind blow? This leads to a discussion of temperature and pressure, and the study of the thermometer and barometer.

(2) What is the prevailing direction of the wind in Columbia? This leads to charting weather reports.

(3) Why does it blow in these directions? This introduces cyclones, highs and lows, and their size, area, track, etc. This shows that the wind is chiefly from the southwest, and south and west, because the track of the cyclones is north of Columbia, and moves from west to east.

(4) Where else can we find the directions of wind determined by temperature and pressure? This leads to the study of planetary winds.

(5) Why do these winds blow in these directions? This introduces the earth as a planet.

B. (1) From which direction do the rains usually come in Columbia? This to be determined by charts.

(2) Why? This leads to a study of the cause of rain, and the source of moisture.

(3) What is the cause of other weather phenomena, such as snow, hail, frost, etc.?

It may be stated that when worked out in detail, these problems embrace about three-fourths of the text, though the order of topics in the text was not followed. Each problem has those topics in the text which bear upon it assigned for reading in connection with it. Then, after this amount of the text has been covered in this desultory way, the class may be turned to the first chapter to go through all the chapters one after the other for the logical arrangement.

The advantages of this plan are, *first,* that a stronger motive is engendered, since both the love of geography and the interest in practical home problems are appealed to. *Second,* when the pupils take up the text in a logical way, they go over relatively familiar material with a rich, recent content gained by the earlier survey. This method is, I believe, of value in the introduction to many of the new subjects of the high school, such as physics, chemistry, biology, etc.

The principle of the psychological organization may be illustrated in another way, by means of the facts of the growth of subject-matter.

Section 5. Growth of Subject-Matter.

From the time of Rousseau to the present there has been a constant use in pedagogy of the term 'development and growth of the individual.' Froebel and the Herbartians used it, and every teacher who has read even a minimum of pedagogical literature is acquainted with the idea.

The idea of growth has not, however, been applied with sufficient emphasis to the different kinds of subject-matter within experience. We speak of the development of the individual, but we do not think as often as we should about the development of each of the subjects by *itself* within the individual. If such application is made of the term to branches of subject-matter, an interesting and valuable standpoint is obtained.

The Capital of the Child.—In the *first* place, just as the individual enters the business world with a certain capital, so he begins the study of *any* subject with a certain capital of that particular sort. For example, when he begins the study of formal history he has already within his experience a considerable mass of historical subject-matter. If a teacher could take the pains to discover the actual working capital that a pupil possesses, the mass would be found to be rather large. Or, again, we may instance the subject of formal grammar, if it is studied in the higher grades. The pupil probably has everything to start with except the terminology, although this capital is in a very inchoate, incorrect, and indefinite condition. Or, take the study of physics in the high school. The student starts with many notions concerning the relation of force to things that he sees about him. These notions are inexact and indefinite, both in meaning and

in terminology. But the point is that he has them, and, moreover, that they are his capital, and that in the face of new situations he has nothing but them with which to work.

Subject-Matter Not Hypodermically Injected.—That is to say, and this is the *second* point, the teacher cannot hypodermically inject new subject-matter into the pupil. The child is at the mercy of what he already knows. He can move forward only in so far as problems of development emerge within this capital that he has. If they do not arise within this subject-matter the thing which the teacher thinks he is teaching slides off the child's experience like water off the proverbial duck's back. Each branch of subject-matter grows just as the individual grows, by the development of what he already has. This does not preclude the "introduction" of new material. It simply lays stress upon the fact that the idea introduced gets meaning for the child from whatever reorganizations of experience he makes in order to get control of it. The first time he sees a mountain it means to him no more than he can gain by reorganization of what he already has. In this sense we rather get him to reorganize his experience so that it will approximate to the racial organizations than put into him new subject-matter as we add potatoes to a bin.

Child Subject-Matter the Focal Point.—In the *third* place, the important factor for the teacher, the one which he should keep in mind, is not the logically arranged textbook but the subject-matter within the experience of the pupil. It is almost an obsession with us who teach, to have the subject-matter we are about to present always in

the focus of attention, rather than the subject-matter which the pupil already has. Yet if the subject-matter within the pupil grows only by means of problems arising one after another, it is very evident that the condition in which it is situated in his mind and organized within it may be very different from that which we have so nicely organized within our own minds. It is unfortunate that we cannot get as clear an image of what his problems are as we have of our own, and one deficiency of ours is that the problem of imaging the state of the subject-matter within him is not so seriously attacked by us as it should be. To be sure, the knowledge of his mental content cannot be attained to any complete degree; the value to be gained from attacking this problem is essentially that of securing the right attitude, rather than that of securing any definite picture.

Historical Growth of Subject-Matter.—To emphasize the fact that subject-matter grows in the individual we can point to the historical organization of subject-matter. We have on record the different types of problems and organizations of subject-matter in the various branches. A study of the history of mathematics shows us that the organizations of the problems which the race has had at different times are very decidedly different in form from our own, but that out of these, by gradual growth, has developed the modern subject-matter. And while it cannot be maintained that the child duplicates the race in the consecutive order of his problems and his resultant organization of subject-matter, a study of the history of different branches of knowledge will illustrate by analogy the fact that the immature child differs very materially and widely from the mature and well-trained teacher, just as the old

type of problems and their solutions differ from those of modern times. If we could remember that the subject-matter within each individual developed genetically from very crude and simple subject-matter by means of problems which arise within experience, as well as we remember that subject-matter developed historically within the race from very crude beginnings by means of problems which arose within racial experience, we would see more clearly the necessity for intellectual sympathy with children.

CHAPTER XVI.

METHODS OF SECURING REALNESS.

If we were able to follow the child slavishly and solve only those problems for him which arise without our manipulation, there would be little need for trying to make situations real. But in the ordinary course of school work, with subject-matter to be presented to the pupils, very frequently great care has to be taken to assure the realness of the problems which are to be attacked and of the solutions which are to be arrived at. Under these conditions some discussion of the methods by which realness and vividness may be given to the subject-matter is advisable.

Problems.—One method very frequently discussed is that of making the problem solved by the subject-matter the problem of the pupils. It requires the teacher to search the experience of the child to find things of value in the control of which a breakdown can be made to occur, such that the subject-matter will appear as the remedy. This does not require further elaboration at this point.

Imagination.—Of the other aids to realness imagination and comparison are chief in importance. (In treating imagination no function of the image except that of making situations more real and vivid will be discussed.)

The average man does better and more intelligent work, and has clearer and more intelligent opinions upon his

own work than upon that of any other individual. The reason for this is that in his own case he has the facts, the ideas, feelings, etc., with all their associations, at first hand, and easily within his observation; while in thinking upon the plans and work of other people he has to build up in imagination the situation which their work is supposed to involve.

It is also generally conceded that any one can do intelligent work in other than his own actual conditions in proportion to the truth, clearness, and vividness with which he can build up these other conditions, in his imagination. The Englishman can give better advice to another Englishman than to a Chinaman. A man is better able to understand other men than he is to understand women. And this for the reason that he can put himself into the exact situation of the person to be understood in the one case better than in the other.

In school the child is sometimes by necessity removed from the actual situations which he studies. It is impossible for him to live in Athens with Pericles or in Rome with Augustus Cæsar. In studying arithmetic he cannot be the grocer, or the banker. In literature he cannot be Macbeth or Hamlet. Because he is removed from the real situation he cannot do as intelligent work as if the conditions were actual. And hence the immense importance of making the situations which he studies, be they historical, arithmetical, or literary as real as possible through imagination.

And, indeed, the child is more capable of such imaginative work than is the adult. He is just emerging in the grades from the world in which he actually has to learn to distinguish the real from the imaginary, and without

great effort he can be led to reconstruct the historical situation with a good deal of vividness and more or less correctness. In arithmetic, it is not hard for him to imagine himself to be a banker charging interest and floating stock companies, providing the teacher does his part in supplying inspiration and aids.

The aids which the teacher has at hand to assist are of four sorts. *First,* there is comparison of the imagined situation with the pupil's own experiences, secured by first of all advising the pupils to imagine themselves to be in the situation, and then describing it by similarity and contrast with that with which the teacher knows the children are familiar.

Second, there are material models, specimens, etc. In illustrating history we may have the actual instruments and clothing used by the people. We may have specimens of work that they did and of the things that they built. When we cannot have these, we may have models of them, models of Grecian houses, models of fortifications, etc. The sand table, well utilized, is one of the best instruments at the teacher's disposal (in some cases even as high as the eighth grade) for making the situation real.

Third, he may utilize pictures, diagrams, maps, and blackboards. Pictures are of great service in geography; diagrams may be used to advantage in arithmetic. It is impossible to teach campaigns in history without the use of maps. (The use of the blackboard is reserved for a separate treatment.) These all in their way tend to make the situation real. Indeed, pictures and models are often better than the actual situation because they center the attention upon the important points, while in the actual situation the attention may not be so centered.

Fourth, another aid to the teacher is dramatization. This is probably the greatest aid to the imagination. Pictures assist somewhat, maps assist in their degree, specimens are useful, models give contour, but dramatization gives all these and more. These other aids lack action. They are dead. The imagination has to make them live. Dramatizing a banking house, a grocery store, William Penn and the Indians, gives life and force to what knowledge the pupil has. Dramatization assists the imagination most effectively and forms a better skeleton around which the imagination may put the flesh of real life.

Dramatization.—The advantages of dramatization are, *first,* as just said, that it makes the situation very real, and *second,* that it gets the child into the habit of seeing things vividly, so that the imagination has through it a high standard set which it will in the absence of dramatization seek to reach. That is to say, if in early life the child has dramatized much he will get into the habit of imagining things clearly, and in the higher grades, in the high school and in later life, when a situation is put before him meagerly without the vivid dramatic element present, his imagination will have a tendency not to rest content, not to feel comfortable, until the situation has been brought up to the high standard of reality to which it has been accustomed.

There is always a question for the teacher as to the amount of dramatization that ought to be used in the school. Part of the question can be eliminated if we remember that the chief reason for the use of dramatization is its capacity for making a situation real. Dramatization, as mere dramatization, ought to occupy a very small space in school life. Therefore, unless it is brought into line

with the problems of the lesson and used as an aid in making them real, it should be rigidly excluded. In the case of valuable dramatization the question remains as to how much there should be in the first grade, and how much should be in the eighth grade. The only light that can be thrown upon the question comes from the fact that in the recitation the child is trying to do something, and that dramatization will assist his imagination to make it more real. Therefore, where the subject-matter needs many aids to make it concrete, or where the child is better able to deal with concrete as over against abstract situations, the dramatization should be used to the greatest extent. Seemingly it is most at home in the earliest grades, for the child is living in the world of imagination; he thinks concretely and thinks naturally in dramatic form. But in the eighth grade, after a long course of training in taking symbols and making them real by means of the aids already mentioned, he ought to be able to get along with less dramatization, with less verbal description than in the earlier grades. If he is able to realize the situation without the aid of any of these props it is better for him to do so, and if he *can* do it, it indicates that his imagination has grown strong and effective.

Blackboards.—A separate chapter might be devoted to the use of the blackboard in making situations real. It seems almost as though student teachers were afraid that the blackboard might be worn out or that chalk was expensive. Because of their recognized value, blackboards are put in at great expense by school boards and given a prominent place in the recitation room often to be little utilized by the teacher. If a word is not correctly pronounced or if a new word is met, does the student teacher

write it on the board? Rarely. If a sentence in history needs explanation and could be explained by a diagram of three lines on the board, would the student teacher use it? Never. He prefers to spend a minute trying to give a hazy idea and even then probably fails. If a difficult lesson is to be developed does the student teacher put the main topics on the board to assist in the summary? Seldom. One would think that the board would be used a great deal in geography, but it is not.

This is an extreme statement. Conditions are not quite so bad as this; but they are bad. When one thinks of the increased ease with which so many pupils *see* relations; of the value our outlines are to ourselves, of the fact that many people think best when they *see* what they are thinking about, it makes him wonder why the blackboard is so little used.

It has been said by some that the blackboard should show at the end of the lesson an epitome of all that has been developed in the recitation. This is extreme, and cannot always be done, especially in such subjects as drawing, manual training, music, and, perhaps, reading. And it need not always be true in the case of geography, history, or arithmetic. The *end* is not the utilization of the blackboard, but the making of the subject-matter clear and real, and if this can be secured most economically without the blackboard there is no reason for using it. But the lessons in which facts are to be collected and organized are few in number where the points should not be written on the board as they are made, or before the end of the lesson. And, moreover, there are very few lessons of any sort which cannot be gotten under better control by the children through the liberal use of this instrument.

Experience.—It has been constantly implied and should now be definitely stated that the material upon which these instruments are used is the past experience. In dramatization, and in the use of pictures, models and specimens, the thing that is being operated upon is the past experience of the child. If I speak in a farming community I use one sort of instrument appealing to the past experience of that group; with city audiences another instrument is used to tap other past experiences. And teachers often fail in making the situation real because the illustrations they prepare so carefully are above the heads or beyond the experience of their pupils. It is the inalienable right of every child to have the educational gospel presented to him in his own tongue.

Comparison.—Comparison, the other psychological process to be discussed, has two sorts of values. In the *first* place, it aids the teacher in making situations clear and vivid, as has been said. The pupil draws from his past experience things similar to those in the situation. For instance, in trying to get a true picture of Wordsworth's *Fiddler* the pupils are aided materially by being referred, on the one hand, to their own experience with fiddlers on the street, and on the other hand, to the influence of music upon other people, as shown in Browning's *Saul,* and Dryden's *Alexander's Feast.*

This comparison is sometimes called illustration, and sometimes analogy. But of whatever sort, it is of paramount importance in getting hold of situations in the sense indicated above. The convincing speaker is frequently one with convincing powers of comparison. The teacher has a broader influence, and can get better results if he

has telling comparisons by which to make his explanations understandable.

The *second* value that comparisons have (to be discussed more fully in the next chapter) may be called comparisons of application. That is to say, after a solution has been reached the process of comparison makes it possible for us to observe relations with other problems so that we may apply the solution to other similar situations. In history, after we have treated of a problem of the ancients, it is legitimate and valuable to refer the problem and its solution to modern life to see if we can find the problem still with us, to find in what respects it differs in form and to what extent the solution of the ancients will fit our conditions.

CHAPTER XVII.

DRILL AND APPLICATION.

Section 1. Subject-Matter as an Instrument.

The fact that subject-matter is an instrument created for control has further implications. In the *first* place, it implies skill in use. Development of technique is essentially the secret of increase of skill in using instruments intellectual or muscular. In the *second* place, it implies use in different situations of the same type. The subject-matter worked out to control one situation may be used to control other situations differing in incidental circumstances, but similar in type. For instance, the Golden Rule studied in Sunday school to explain the character of Jesus, may be used in situations to which it is applicable, during the week outside the church. Ability to use the instrument with skill in many situations of the same type is indicative of high grade efficiency.

Value of Skill.—One thing that makes a great difference between men is the difference in skill. When competition is so keen and men are so plentiful, the margin that separates success from defeat is a very narrow one, and that margin is usually secured by a slight superiority in skill. In running, the victory goes ordinarily to the one who is best trained, and most skillful in the devices of the art, and usually the margin between one contestant

and another is small. In teaching as well as in the other professions and in business, skill gives one man precedence over another. It has become a trite saying, and therefore an important one, that it does not matter so much what a man can do as how well he can do it. The quickness, the dispatch, the exactness with which he can do a thing must be added to the fact that he can do it at all. Many men can perform surgical operations, but the man who is the greatest success in surgery is the one who can perform them with the most skill. Many men can play baseball; but the only man who stands out as a success in baseball playing is the one who can play with consummate skill. It would seem, therefore, that skill, in the close competition of life, is absolutely necessary.

Moreover, skill gives direct satisfaction. To control values is a fundamental desire of experience, but a high degree of control gives greater satisfaction than a lower degree. Moreover, skill gives strength of personality. Strong men are sure of themselves. To be sure of himself one must know that he is able to control a situation. To be able to control a situation, and to know that one is able, are two different things. But unless one is able, there can be no true knowledge of ability.

If skill is so important in the world at large, it must be made one of the aims of the schoolroom. Not only must the child be able to do the problems in arithmetic, not only must he know his history when he has time to think it out, not only must he be able to draw and to understand the procedure in drawing, but he must be rapid and exact in arithmetic, logical and expeditious in his history, artistic and facile in his drawing.

Uses of Subject-Matter.—Subject-matter is divided by some writers into three classes, cultural, disciplinary, and instrumental. These divisions may be made the basis for discussion of the uses of subject-matter. But rather than say that there are three classes of subject-matter, we describe the facts more exactly by saying that all subject-matter has three uses: cultural, disciplinary, and instrumental. By the cultural use of subject-matter we mean its relation to the feelings, interests, biases, temperament, and tendencies, to the richness of life as suggested in the term *appreciation* of values. By the disciplinary use of subject-matter we mean its relation to the *skill* and *training* which is given to the individual in the assimilation of subject-matter. By the instrumental function of subject-matter we refer to the fact that the subject-matter is an *instrument* which provides control. The cultural conception views it in relation to appreciation, the instrumental in relation to control, and the disciplinary in relation to skill in control.

For instance, writing may be viewed as cultural in so far as it has a generalized effect upon appreciation of values, i. e., in this case, upon pleasure in writing and upon satisfaction in being able to communicate ideas. It is said to have a disciplinary function when we are thinking of its effect upon the muscles which are employed in writing. It is viewed as instrumental when we think of the ways in which it will enable us to communicate our ideas to others. And just as writing has all three functions, so also does each form of subject-matter possess them all.

However, while each unit has all three of these uses, it may have one or another strongly marked. For instance, "Treasure Island" may leave as a result of its

study no increased control of the process of writing themes, no greatly increased training of memory or imagination, but it does leave a richer appreciation of life and of stories of adventure. Again, a study of the grammatical rules may not be especially satisfying to a pupil, nor may they train his powers of memory to a noticeable degree, but they are of great use in all linguistic exercises.

When Shall Drill and Application be Given?—These three distinctions in function provide a means for determining when drill and application should be given by the teacher upon any unit of subject-matter.

Culture Units.—When the teacher teaches a unit of subject-matter he may view it as *chiefly* cultural in its use. It is of use *here and now*. It helps the child to get control of *this* value. It gives him *present* richness of experience. But it may have little use outside the present. Much of our literature is chiefly cultural. The vast majority of the selections in readers have no definite use outside the satisfaction of present needs. These selections give the child control of these needs, and the control so gained works over into the unanalyzed residuum of the pupil's experience, but it may not be used again in any definite and exact form. It disappears into the unanalyzed values, tendencies, and habits of experience, and leaves behind just such a precipitate as food leaves when it is assimilated. Again, in history, many of the facts and details are of use only for the present; they solve some immediate problem, give some immediate satisfaction, and have then fulfilled the major part of their usefulness.

Instrumental Units.—But there are many units which will be of use again and again, and in instances widely

separated in time. The multiplication facts, and the facts of grammar, are instances. The great fundamental principles of every subject are predominantly instrumental. In literature many units have, in addition to their cultural value, their instrumental function also strongly present. It is this instrumental use that leads us to memorize them. We want to be able to use them again and again.

The Disciplinary Function.—We have exercises which look primarily to skill and training. All drill exercises are of that sort. Memorizing is essentially intended to give increased skill. Boys "playing catch" are working for training and skill in throwing and catching a ball. But as was pointed out in Chapter 1, many units produce discipline of powers merely as a by-product.

Conclusion.—Units which have chiefly a cultural value do not need to be drilled upon, for they perform their use at once and sink into experience. Units which have a strong instrumental use, which can be used again and again, need to be so handled as to be retained in definite form in experience for future use. The more likelihood there is of a unit's being used frequently, the more care should be taken to have it well established in experience.

Section 2. Application.

There are two methods of securing skill. One is by drill; the other is by what is technically known as "application." By drill is meant the reviewing or repeating of a unit over and over again in the same situation. By application is meant the use of a unit in a new situation. We drill upon the Golden Rule when we memorize it. We apply the Golden Rule when we use it in the affairs of

our daily lives. We drill upon weights and measures when we memorize them. We apply them when we work problems involving denominate numbers.

Its Importance.—No two situations are ever exactly alike psychologically. No moral situation ever has quite its exact duplicate. Every time the "same" history lesson is studied it is a somewhat different lesson. New depths of experience have been added and new factors have entered in during the interim. The problem comes up again, but with disturbing elements. The individual who solves a problem one day is a different individual on the succeeding day when he faces the problem again. Hence there *must* be some modification of solution in every situation.

On the other hand, however, the situations in which we find ourselves placed may be classified according to types. We have good situations, bad situations, situations involving fractions, decimals, and addition. Other situations may involve eating, meeting friends, care for the sick, and resuscitating the drowning. Still others involve gravitation, induction coils, wireless telegraphy, and centrifugal force. Every situation comes under some previously known heading, or, if not, the individual is relatively helpless in confronting it.

The school can assist the child to handle some typical situation of each of the great and fundamental needs. It is impossible to bring the pupil face to face with every situation that will confront him in life, because, in the *first* place, they are too numerous, and, in the *second* place, he changes from year to year. Therefore, in the face of these conditions the school is *compelled* to attend to the great and fundamental solutions for the great and fundamental

problems of life, and to the application of these to a few of the situations in which they are involved.

But while few applications can be studied, in comparison to the many the child is facing and will face, the study of these few is absolutely necessary. For if the application is not shown or made, the instrument loses its power, becomes obsolete, and is soon discarded from memory.

Its Difficulty.—While it is extremely important that applications should be made, it is extremely difficult to make them wisely. The applications of the Golden Rule are difficult to make, no matter how strongly we believe in it. The business man may find it easy to be generous to his family and fail to apply this generosity in dealing with his employees. Teachers know the disappointments that come when students fail to make a perfectly obvious application of a principle to a situation differing ever so slightly from those previously handled. It is a mistake to hold that if students are given principles they can make the applications for themselves. For learning principles is child's play compared with their application. The Golden Rule, again, can be learned and *understood* by a ten year old child. But we have been 1,900 years learning to apply it, and have not made a success of it yet.

The *first* cause of this difficulty is that there are so many other elements in any situation that the type element is obscured. The business man in dealing with his employees fails to see that his problem is one of sympathy for them, because profits, incompetency, and personal dislike may be present, and he cannot get a clear view of the sympathetic element. The sixth grade boy cannot solve his problem because he cannot see that division is the key to the solu-

tion. The youth who has learned habits of honesty often fails to be honest with himself, because he fails to see that it is a question of honesty. He may pay attention to rapidly acquired wealth, or to a reputation for shrewdness.

The *second* cause of this difficulty may be that when the pupil does see the typical problem in the situation he may not be *able* to make the application; circumstances and conditions may be too hard for him. The situation may be so different from those to which he is accustomed that he cannot make the adaptations of his old methods to handle it. His problem is beyond him.

Both these cases call for powers partly native and partly acquired. Open-eyed alertness, strength of purpose, and resourcefulness are all necessary. Children differ in ability. "Some children are born long, and some short." Over native ability the teacher has no control. But in so far as these powers *may* be cultivated, the school has a duty to perform.

This may be accomplished in part by the teacher who makes the development of these powers part of his aim in teaching. Challenging pupils' set opinions, introducing difficulties, leading them on to absurdities until they are *sure* of their opinions, will do much if carried on sympathetically.

Applications Set by the Teacher.—Part of the work of application may be accomplished by the teacher who sets varied problems, differing externally, but depending upon the principle at issue for solution. The more varied the application, the greater the training. Particularly valuable is it to find problems within the intimate experi-

ence of the children, which may be solved by principles studied in school. No rules can be laid down for these. Breadth of experience and ability are necessary to find such problems. One of the evils of "feminization of the schools," if there is such a thing, will arise from the fact that women teachers may not know enough about the inner span of a boy's hopes, feelings, and active life to search it for vital situations in which application of school solutions may be made.

Specifically in school work the teacher of history should seek assiduously for modern problems akin to the ancient problems studied. The teacher of literature will *bring home* to his pupils the theme of the selection studied. The teacher of arithmetic will find in the practical life of the boy or girl the problems that may be solved by arithmetical principles. And the teacher of language should utilize the forms of language in having the children convey their valuable experiences.

Applications Set by the Pupils.—Not less important is the practice of having the children find situations to which the principle will apply. For in the *first* place, it gives the control of the principle that comes from mastery. To be able to take the principle and handle it gives familiarity therewith and power to utilize. In the *second* place, it makes the pupil independent of the teacher. He becomes in his crude way an original investigator and a disseminator of knowledge. It appeals to his puzzle instinct. His powers are stimulated to search in wider fields. He does not follow, but leads.

In school, the teacher of history may ask his pupils to find cases in history or modern life where the same prin-

ciple is involved. In arithmetic the pupils may make up problems. In grammar they may collect instances. In geography they may give problems from the environment of the school. And in all such instances a premium should be placed upon originality.

Section 3. Drill.

Drill vs. Application.—Drill differs from application in that it goes back over the same principle again and again until control is secured in one situation, while application seeks to apply the principle to new situations.

It is claimed by some that drill is not a necessary school process. It is asserted that if the pupil utilizes the principle in new situations, sufficient skill will be secured. For instance, it is said that writing exercises, as such, are not necessary; that if children are taught to form the letters they will become sufficiently expert if they merely write the papers and exercises which are involved in the study of arithmetic, history, or geography. Again, following this principle, drill on the multiplication tables is not necessary; sufficient control comes from working problems involving multiplication.

However plausible this theory may be it is not true to life. Outside of school, children and adults drill themselves. A boy who has just learned to whistle practices for days to the distraction of all within sound of his efforts. Youths will spend hours by a barn-side drilling on a new serve in tennis. Musicians spend years practicing scales Wherever there is a desire for skill in technique there is a necessity for drill. And the greater the desire, the more strenuous the drill.

So, in school, there is the most urgent necessity for

memorizing and drill, for review and re-review. And this stands in the greatest need of being emphasized, for in recent years there is a pernicious tendency afloat in pedagogical literature and practice to the effect that what is needed is that pupils *understand* what they study rather than that they should memorize it. As if there were any antagonism between reason and memory! Why has nature given us memories? And why does the popular mind exalt the man of strong powers of memory? Entirely for the reason that memory has such a tremendous place in life that the recognition of its value has become almost an instinct in the race. The theory that what is needed is not facts stored in the memory, but a knowledge of where to find facts when needed is harmful. In ninety-nine per cent of the cases our solutions must be worked out in terms of what we know. We have neither time nor opportunity to rush to books before we arrive at a solution. If we waited to do so, the time for acting might be past.

But among all the facts acquired only those should be drilled upon which will be used again and again in life. Only the important instrumental units should be memorized. In the olden days everything was memorized, nothing understood. And then the revulsion came which was voiced in the sentiment, "Reason out everything, memorize nothing." Now we are ready to accept the good from both, to reason out the principles, to select those that are of most utility, and then memorize them, till a glibness ensues that outrivals the glibness of "eenie-meenie-miny-mo."

Standards of Efficiency.—The standard of efficiency remains the same throughout the succeeding grades, viz., *as great efficiency as the pupil is capable of.* If tables are to be learned they should be learned as thoroughly as pos-

sible. If poetry is to be memorized, it should be made as nearly letter perfect as possible. Speed should be insisted upon up to the limit of capability. Facts should be learned definitely, names should be memorized *correctly* and familiarly, and speech should be as fluent as is possible. Stumbling reading, indefinite facts, sluggish tables make for inefficiency. At some point there is a maximum of *speed* and *accuracy*, where accuracy is not sacrificed to speed nor speed to accuracy, and upon this point the teacher fixes his gaze.

Intellectual Memory.—The factors in memorizing are the following: *First,* concentration of attention upon the thing to be learned. *Second,* repetition. As Bagley puts it, memorizing comes by "focalization plus drill in attention." *Third,* persistence in unaided efforts to recall. Probably half the inefficiency in memory can be traced to the fact that the student gives up too soon in trying to recall a forgotten fact. He either turns to the book for it, or ceases to think about it. In either case he is not giving his memory the assistance it deserves.

Motive for Drill.—One problem before us throughout has been that of securing motives. In this connection it emerges again. How shall we secure a motive for drill? That much drill is dead and deadening is a matter of common observation. Some teachers claim that we should so sugar-coat drill that the pupils will be made to do it without recognizing it. But this is not true to life. Children enjoy repetition outside of school; why not in school?

For a motive for drill we may go, *first,* to the pupils' love for drill upon those things which appeal to their immediate interest. For drill upon other things we may go,

in the *second* place, to our oft-repeated principle of breakdown in control. For pupils will drill upon those things for which they see drill is necessary in order to secure efficient control of other things which they feel to be of value. In other words, a motive for drill is found when in pursuing work more drill is felt to be necessary.

Illustrations of this are numerous. A group of pupils intent upon playing a game and adding up their scores to see who is the winner raise a clamor to the teacher for drill in addition to keep the game from standing still. A football team after a stinging defeat "gets down to business," as the coach expresses it. A boy who cannot find out how much it will cost him to make a hotbed because of lack of speed in lumber measures is in a receptive state for drill. Students in high school who have trouble with second-year German because of weakness with grammatical rules feel the need for drill upon the first year forms.

Preparatory Drill.—A query arises: Since pupils undertake drill with so much greater spirit when they feel the need for it, ought any drill be given before situations actually arise in which they see the need? It would seem at first glance that the answer would be in the negative. But since the motive is the thing we are after, it is possible to secure it by bringing the students to see that the principle will be used frequently, and that a little drill now will save trouble later. This is true to life. We look ahead and prepare for the future.

But two remarks are necessary: In the *first* place, children do not have the foresight of adults, and too much drill before a necessity for it is seen is deadening. In the *second* place, the teacher may create simple situations

which make them feel the need. Talks on saving time, problems dependent upon speed, may be found to lighten a prolonged period of drill, such as is required, for instance, in arithmetic.

CHAPTER XVIII.

ASSIGNMENT.

Nature of the Assignment.—The assignment and the study of the assignment are in many respects similar to the recitation. In making the assignment problems are raised and more or less assistance given in solving them. In the study of the assignment the solutions are expected to be completed without further assistance by the teacher. These two differ from the recitation in the relatively smaller amount of assistance given in the study of the assignment. The study of the assignment is, therefore, more difficult than the recitation. Being more difficult, it requires more expert preliminary assistance from the teacher.

The methods and degree of assistance to be given can be discussed to advantage by considering the various types of assignment.

Old and New Work.—Sometimes the assignment is an application of the work of the day. For instance, after a rule in grammar or a principle in arithmetic has been gained by the pupils the assignment may consist partly of a drill upon the work covered, and partly of a series of problems whose solution depends upon the principle of the lesson. In Chapter 15, at the end of the type lesson, some assignment questions in history are given. In assignments of this sort, if the work is well chosen, no more time need be taken than is necessary to desig-

nate the problems of the text or for writing them down in note books (if not in the text). In case there are, however, any points that will give unnecessary trouble these should be explained by the teacher.

Sometimes the assignment is upon a *new* lesson. In this case time has to be taken to create the need, or at least to set clearly and definitely before the pupils the problem to be investigated. Time has also to be taken to develop the solution far enough for the pupils to carry it on unaided. Sometimes this may require half the lesson period; frequently two or three minutes is enough. The method of raising the problem or of developing the solution has already been discussed, and needs no further illustration here.[1]

Assignments of Greater and Less Difficulty.—The assignment most difficult for the student to handle is that in which he is made conscious of neither the problem nor its solution. "Take for your next lesson to page —," is an illustration. This presupposes that the pupil can both discover the problems solved by the author and understand the solution. The danger in such an assignment is that the children will read only isolated sentences and ideas, and will be able to recall only those which accidentally stick in the memory. They are very likely to get no perspective of facts. Or, to put it in our familiar phraseology, they will not be likely to see what problem the author is attempting to solve.

[1] In all cases, every child who uses text-books and has study assignments that are not left written on the blackboard and studied in the class room, should have an assignment note book, for it is evident that oral assignments will be often misunderstood or forgotten by the time the pupils begin to study them.

This sort of assignment is the ideal toward which we should work. But it is doubtful if students can handle it successfully even in the high school. Instructors frequently find college students unable to handle it efficiently.

That mature students cannot use it successfully does not prove that it is too difficult. It points rather to the fact that we teachers are prone to use this type of assignment to the exclusion of all others. We do not use easier methods of assignment first, and by using these easier forms *teach* the children how to study text-books.

A *second* and easier form of assignment is that in which the problems are raised in class and their solutions worked out by the pupils unassisted. This is relatively easy in literature. Instead of merely assigning *Excelsior* (Chapter 6) the following problems (questions) may be given.

(1) Collect all the phrases in the poem which describe the boy.

(2) Why do you think he kept going on?

(3) Find the meanings of all the words you do not understand; (or, Find the meanings of the following words ————————).

It may be explained parenthetically that questions given should be as few in number as will bring out the gist of the problem. Many questions waste valuable time in copying. Few questions should be given that can be answered by yes or no. The first question given above would insure the careful reading of the poem, the second question gives the theme of the poem (solution of the problem) in so far as the pupils can grasp it. With older pupils a fourth question might be added, (4) This is an allegory; explain what the boy and what each scene stands for. Or this last

question might, in such case, be substituted for (2) above.

In the history lessons in chapter 10, assignments may be made as follows, according to the outlines there given:

Lesson 1.—(1) What conditions up to this time made for union? (2) What against union? (3) What new factor entered that affected the situation? (4) What did the Albany Conference do that affected union?

Lesson 2.—(1) State the long standing conditions that led to the Seven Years' War. (2) State the immediate cause. (3) Outline the main lines of campaign in America. (4) What effect did this have upon the movement toward union?

Lesson 3.—(1) What were the new conditions that led to the Stamp Act Congress? (2) What did it do? (3) What effect did this have upon union?

A *third* and still easier form of assignment is that in which the problems are set and some assistance in the solution given. The amount of assistance to be given is determined by the relation between the difficulty of the assignment to the ability of the pupils. If these are equal, no assistance is necessary; if the pupils' ability is not equal to the difficulty, enough assistance must be given to make the terms equal.

For instance, in the assignment above, on *Excelsior,* in connection with the fourth question the teacher may find it necessary to tell the pupils that the poem represents the efforts of ambitious youth to realize its purpose in life, and may then substitute for the question as given, the following, "What does each scene stand for?" Or the teacher may have to go over the poem rapidly in class, explaining the meaning of words sufficiently to enable the children

to get some fairly definite idea of the poem before the assignment for study is completed.

In the first history lesson given above (Chapter 10) the teacher may find it advisable to state that the serious nature of the French and Indian incursions made it now advisable for the colonies to combine for defense, that they met at Albany in 1754; and that there Franklin introduced a comprehensive plan that was not accepted, but which was of importance because of its effect upon the movement toward union. Then the questions given on a preceding page may be introduced, and with text in hand the teacher may indicate points to which particular attention should be paid.

The point to be insisted upon again is that the teacher should gauge the difficulty of the assignment by the ability of the children. Perhaps the teacher will have to use the latter form for months, and perhaps with a particular class will never be able to assign by the first form during the whole year. But the teacher should not rest content with the simpler forms. Progress should be continually aimed at. We do not wish to break the spirit of the child by difficulties too great for him to master, nor to dwarf him by simplicity which does not use his powers sufficiently.

Problems of Immediate and Mediate Interest.—Another concept that helps us to understand the problems of assignment is immediacy of interest. In *Excelsior* we presupposed that the children would be interested in the poem for its own sake. Should this not be the case, we would have to consider its function for the author or for the child, depending upon the pupils' maturity. Suppose the pupils were mature enough to appreciate the author's function, but were not likely to be interested in the poem for

its own sake. Then we would have to find a situation in which they would realize their lack of control of some value. This might be done as follows. First, have a chat about the value of ambition to young people, getting illustrations of success because of it, and failure because of the lack of it. Then the teacher may follow with the questions, How ambitious should we be? Should one leave one's home and go somewhere else because of his ambition? Should he endanger his health because of it? Should he be willing to undergo hardship? Should he stop going to church? Questions of this sort rapidly given and rapidly discussed, will bring out differences of opinion, and will not consume much time, if properly guided. Then the teacher may make the assignment: Take the poem *Excelsior,* which describes what one ambitious boy did. In doing so:

(1) Collect all the expressions that show his ambition.
(2) Find what things he gave up.
(3) Was he justified?

In the history lesson given above we have gone on the supposition that the problems of the new lessons were of interest not because of themselves alone, but because of their relation to the main problem of the historical sequence.

In conclusion it is re-iterated that the assignment should be made as definite as is economical of the children's effort. Topic assignments should usually be made, even in the high school, and frequently with the exact page for each topic mentioned. The assignment, "Take from page — to page —," should never be given unless the teacher is sure that the class is strong and equal to it.

CHAPTER XIX.

THE LESSON PLAN.

Section 1. The Writing of Lesson Plans.

The most perplexing problem that confronts the practice teacher in the preparation of lesson plans is that of placing in a written form the things he wants to do in teaching a lesson. It is one thing to have a lesson plan; it is quite another thing to write one.

Yet the difficulties are chiefly mechanical, and arise from the fact that each thing to be done has to be put *somewhere*. Students worry over whether a particular thing to be done should be classed under preparation or development, under development or application. For instance, should the review of past experience be put in the preparation or the development? Or should the reading of a literature lesson be placed under application or development?

As a matter of fact, it makes little difference what we *call* anything to be done, provided we do it at the right time. Hence, McMurry[1] is wise in presenting a lesson plan which does not have the different phases marked off by lines. And in the same spirit of not introducing too many technicalities, the critic teacher is wise in laying down few rules in regard to the written form. If the

[1] "The Method of the Recitation," pp. 329-332.

practice teacher shows that he has obeyed the *principles* of teaching in his lesson plan, he may be excused from slavish adherence to any set form.

Methods of Alleviating Drudgery.—The written lesson plan is the heaviest cross of practice teachers. This is due to the mechanical difficulties just mentioned, and to the drudgery of writing it out in legible form for the critic teacher. The critic teacher views it with hardly less dread than the practice teacher, for it means laborious monotony day and night. On the other hand, it protects the pupils from glaring errors in subject-matter and method. Writing the plan out makes the student think it out more exactly, and, in some cases where the student-teacher is inclined to slight his work, the written plan serves as a check against neglect.

How to alleviate this drudgery is an important question. The following plan is suggested. For purposes of explanation, let us group the practice teachers in three divisions, strong, medium, and indifferent. For the indifferent students there is no recourse except the writing of daily lesson plans, full and complete, as a check upon their carelessness. For the others let us suppose that they are to teach twelve weeks. Require full lesson plans from everybody for a week. For two weeks at critic meeting take up the question of subject-matter, and nothing else. Then have the student teachers hand in plans in which subject-matter is worked out carefully, and do not ask for a statement of method. Since we have already eliminated the indifferent the critic teacher knows that even though the student does not *write* his method, he is *thinking* it out from day to day. As the weeks go on require the students to hand in subject-matter plans until there is confidence

that they can organize it satisfactorily, and then there is no reason why they should not be excused from handing this in, though of course they will still work it out carefully for themselves. The strong students can be excused by this arrangement.

After spending a couple of weeks on subject-matter in critic meetings, the preparation phase may be discussed at a meeting or two, and during that time the students should hand in plans particularly full on this phase. When the teacher is sure that they can apply the principles reasonably well they may be excused from handing in the plans. Then proceed to the principles of realness, or solution of problems, or whatever else is needed, *one at a time*, and expect particular attention to be paid to each till fairly well mastered.

This plan lightens the work of the critic teacher in these respects. The strong practice teachers can be excused from writing full lesson plans, the medium teachers can be excused from those parts in which they are strong. And the fact that they will be excused from the written work as soon as the teacher has confidence in their ability to handle it will raise the tone of the preparation of the whole class, strong, medium, and negligent.

In so far as the practice teacher never grows strong enough to be trusted in any of the work, there seems to be no practical way to get rid of this drudgery.

Section 2. The Form of the Lesson Plan.

In this concluding chapter it is advisable to gather the principles discussed into a definite form of lesson plan. The following is presented as a convenient form in which

to embody the principles of teaching, but is not advocated as the only form which may be used to embody them.

A Form of the Lesson Plan.

A. Logical Division, or, Subject-Matter.
   1. Function.
   2. Structure.

B. Pedagogical Division, or, **Method.**
   (Teacher's Aim.)
   1. Preparation.
   2. Development.
      Presentation.
      Comparison.
      Generalization.
   3. Application.
      (Assignment.)

Logical Division.—In this division the subject-matter is to be studied without any explicit attention to *method of teaching* it. By *function* is meant the *intrinsic* function or purpose for which the particular unit of subject-matter under consideration has been created by the race or is to be used by the pupils (Chapter 3). The function is found by asking the question, "For what is this unit intended?" In accepting the answer for himself the teacher should bear in mind the remarks on page 47. By *structure* is meant that organization of the subject-matter which shows how the function is realized. Attention in this, which is in reality an outline, must be paid not only to the parts of the subject-matter but particularly to the relation of each part to the central purpose of all the parts (Chapter 5).

The term *Logical Division* is intended to lay emphasis upon the fact, that the *most* logical, most convenient, and most efficient organization is to be made. The structure should represent the summary which the children might give when required to do so (Chapter 15). In the logical division the teacher may place all the problems of application which are to be given to the pupils. If the assignment is to be upon new material (Chapter 17), the function and structure of the assigned lesson may be given in enough detail to show the method of the assignment, when the critic teacher so desires.

Pedagogical Division.—If the teacher has in mind any results of which the pupils are not to be made conscious and if these are different from those in every lesson in the same subject (because of emphasis on a particular point or for any other reasons), these may be stated at the beginning of the pedagogical division under the term Teacher's Aim. If there is nothing different from the usual aims in view, there need be no such sub-topic.

In the *preparation,* the primary thing is to raise the problem, or need, or to make active the motive for studying the subject-matter outlined in the logical division (Chapters 8, 9, and 10). In such case, when the problem has been raised, the pupils should state it in their own terms. If the teacher relies upon immediate interest, then he should state the problem, or aim, to be discussed in concrete form, and should require the pupils to state it in their own words (p. 118). If a specific review of any past experience is to be conducted it may be placed in the preparation providing it is used to raise the problem or to review the previous day's lesson. If it is to be used in

solving the problem it should be placed in the development phase (Chapter 11).

In the *development* phase the problem is to be solved, the need satisfied, or control secured. Here are found the methods of assistance which the teacher will use in helping the students in their efforts (Chapter 12). When the pupils' conscious problem is that of *securing a generalization, a rule, or a principle,* the development phase may be analyzed into presentation, comparison, and generalization, as found in the Five Formal Steps of the Herbartian Plan. In all other cases they are not to be used (Chapter 14). Comparison, however, is to be used continually (Chapter 16).

Summaries occur wherever there is need for the gathering up of a logical statement. The teacher in developing the lesson will not necessarily follow the structure of the logical division (Chapter 15). The development is a statement of the ways and methods used to arrive at the structure of the logical division.

The *Application* phase takes cognizance of two sorts of procedure, drill and application (Chapter 17), which should not necessarily be left till the last of the lesson. They should occur wherever they are needed.

The *Assignment* is of two sorts. There may be an assignment as an application of the principles already learned, or as preparation of new material. In the former case it corresponds to the aplication phase and is governed by its principles. In the latter case it corresponds to the preparation and development phases, and is governed by their principles. That is to say, when new material is assigned, the problem should be raised, and all necessary

assistance for working out the solution should be given when the assignment is made (Chapter 18).

The principles of realness are to be observed in all phases of the lesson (Chapter 16).

It may be said in conclusion that the reason why we speak of three *phases* rather than three stages of the pedagogical division is that each is a phase or an aspect of an organic unity. For we can easily find in the arousing of needs both application of past experience and increased control. In the securing of control new problems arise and applications of previous experience are made. Moreover every application made is a new problem solved, the solution of which gives added control. Each separate phase is isolated for the sake of analysis, but it must be recognized as being at the same time organically related to the others.

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